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Awapatent AB,  
P.O. Box 5117  
200 71 Malmö  
SUEDE

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2000 -01- 31

AWAPATENT, Malmö

Datum/Date

27.01.00

Zeichen/Ref./Réf. 2981378	Anmeldung Nr./Application No./Demande n°/Patent Nr./Patent No./Brevet n°. 98201555.4-2303/0877130
Anmelder/Applicant/Demandeur/Patentinhaber/Proprietor/Titulaire Välinge Aluminium AB	

TRANSMISSION OF THE CERTIFICATE FOR A EUROPEAN PATENT  
PURSUANT TO RULE 54 (1) EPC

The certificate for a European patent, with the  
specification annexed thereto, is enclosed herewith.

G. TERNIEDEN  
Formalities Officer  
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# Urkunde      Certificate      Certificat

Es wird hiermit bescheinigt, daß für die in der beigefügten Patentschrift beschriebene Erfindung ein europäisches Patent für die in der Patentschrift bezeichneten Vertragsstaaten erteilt worden ist.

It is hereby certified that a European patent has been granted in respect of the invention described in the annexed patent specification for the Contracting States designated in the specification.

Il est certifié qu'un brevet européen a été délivré pour l'invention décrite dans le fascicule de brevet ci-joint, pour les Etats contractants désignés dans le fascicule de brevet.

**Europäisches Patent Nr.**

**European Patent No.**

**Brevet européen n°**

**0877130**

**Patentinhaber**

**Proprietor of the Patent**

**Titulaire du brevet**

**Välinge Aluminium AB  
Kyrkogränd 1  
260 40 Viken/SE**

München, den  
Munich,  
Fait à Munich, le

**26.01.00**

**Ingo Kober**

Präsident des Europäischen Patentamts  
President of the European Patent Office  
Président de l'Office européen des brevets



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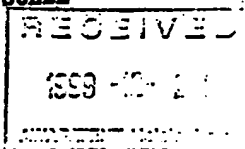
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Date/Date  
16/12/99

Num./Ref./Ref.	Anmeldung Nr./Application No./Demande n°/Patent Nr./Patent No./Brevet n°
2981378	98201555.4-2303 0877130
Anmelder/Applicant/Demandeur/Patentinhaber/Proprietor/Titulaire Välinge Aluminium AB	

# DECISION TO GRANT A EUROPEAN PATENT PURSUANT TO ARTICLE 97(2) EPC

Following examination of European patent application No. 98201555.4 a European patent with the title and the supporting documents indicated in the communication pursuant to Rule 51(4) EPC dated 11.08.99 is hereby granted in respect of the designated Contracting States. Any modifications which were subsequently requested have been approved by the Examining Division. Any corrections requested by the applicant after receipt of the communication under Rule 51(6) and received at the EPO on 00.00.00 have been taken into account.

Patent No. : 0877130  
Date of filing : 29.04.94  
Priority claimed : 10.05.93/SE 9301595  
Designated Contracting States and Proprietor(s) : AT-BE-CH-DE-DK-ES-FR-GB-GR-IE-IT-LI-LU-MC-NL-PT-SE  
Välinge Aluminium AB  
Kyrkogård 1  
260 40 Viken/SE

This decision will take effect on the date on which the European Patent Bulletin mentions the grant (Art. 97(4) and (5) EPC).

The mention of the grant will be published in European Patent Bulletin 00/04 of 26.01.00.

Examining Division  
DALL'ANESE D D

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PLUGGE H B



Registered letter

EPO Form 2006 01.95

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to EPO postal service: 11/12/99



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Datum/Date

30.09.99

in/Ref./RM. 2981378	Anmeldung Nr./Application No./Demande n°/Patent Nr./Patent No./Brevet n°. 98201555.4-2303/
Anmelder/Applicant/Demandeur/Patentinhaber/Proprietor/Titulaire Välinge Aluminium AB	

# COMMUNICATION UNDER RULE 51(6) EPC

Further to the communication under Rule 51(4) dated 11.08.99

your approval of the text to be used as the basis for grant has been  
duly received. *OK/89*

Insofar as you have not already fulfilled the requirements mentioned be-  
low, you are now requested within a non-extendable period of **three**  
months from notification of this communication

- |  | EUR           | SEK            |
|--|---------------|----------------|
| 1. to file in duplicate translations of the claim(s) in the two <b>*</b><br>other EPO official languages;              |               |                |
| 2a. to pay the fee for grant including the fee<br>for printing up to and including 35 pages;<br>Reference 007 .....    | 715.00        | 6440.00        |
| 2b. to pay the printing fee for the 36th and<br>each additional page; Number of pages: 0<br>Reference 008 .....        | 0.00          | 0.00           |
| 3. to pay the additional claims fee(s)<br>(Rule 51(7) EPC);<br>Number of claims fees payable: 0<br>Reference 016 ..... | 0.00          | 0.00           |
| <b>Total amount</b> .....  | <b>715.00</b> | <b>6440.00</b> |

**\***) Translations received by the EPO on 18/09/99.

REGISTERED LETTER

18/9-99

*Ingen*



If the equivalents are given in other currencies, then these come under the provision of possible changes in accordance with Art. 6(4) of the Rules Relating to Fees. Such changes will be published in the Official Journal.

For all payments you are requested to use EP0 Form 1010 or to refer to the relevant reference number.

If additional copies of the patent specification are required, you should request this in writing and quote Fee reference code 0 5 8 when making payment.

If the grant, printing or claims fees are not paid or the translations not filed in due time, the European patent application will be deemed to be withdrawn (Rule 51(8) EPC).

**Note on payment of renewal fees**  
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If a renewal fee falls due between notification of the present communication and the proposed date of publication of the mention of the grant of the European patent, publication will be effected only after the renewal fee and any additional fee has been paid (Rule 51(9) EPC).

Under article 86(4) EPC, renewal fees are payable to the European Patent Office until the year in which the mention of the grant of the European patent is published.

*Rem fee  
5.10.12 m.m.  
Subj m.  
168*

**Filing of translations in the Contracting States**  
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Pursuant to Article 65(1) EPC the following designated Contracting States require a translation of the specification of the European patent in their/one of their official language(s) (Rule 51(10) EPC), **i n s o f a r** this specification will not be published in their/one of their official language(s)

- within t h r e e months of publication of the mention of such decision:

AT AUSTRIA  
BE BELGIUM  
CH SWITZERLAND/LIECHTENSTEIN  
DE GERMANY  
DK DENMARK  
ES SPAIN  
FR FRANCE  
GB UNITED KINGDOM  
GR GREECE



IT ITALY  
NL NETHERLANDS  
PT PORTUGAL  
SE SWEDEN

- within **s i x** months of publication of the mention of such decision:

IE IRELAND

The date on which the European Patent Bulletin publishes the mention of the grant of the European patent will be indicated in the decision on the grant of the European patent (EPO Form 2006).

In case of a valid extension the following Extension States require a translation of the CLAIMS in their official language within **t h r e e** months after publication of the mention of the grant of the European patent:

AL ALBANIA  
LT LITHUANIA  
LV LATVIA  
MK MACEDONIA  
RO ROMANIA (requires translation of the specification)  
SI SLOVENIA

The translation must be filed with the national Patent Offices of the Contracting or Extension States in accordance with the provisions applying thereto in the State concerned. Further details (e. g. appointment of a national representative or indication of an address for service within the country) are given in the EPO information brochure "National law relating to the EPC", edition January 1997, and in the supplementary information published in the Official Journal of the EPO.

Failure to supply such translation to the Contracting and Extension States in time and in accordance with the requirements may result in the patent being deemed to be void ab initio in the State concerned.

Note to users of the automatic debiting procedure:

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Unless the EPO receives prior instructions to the contrary, the fee(s) will be debited on the last day of the period for payment. For further details see the Arrangements for the automatic debiting procedure, Supplement to OJ EPO 06/1994.

For the Examining Division:

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[ ] The text notified under Rule 51(4) EPC has been amended by the Ex-

Anmeldung Nr./Application No./Demande n°./Patent Nr./Patent No./Brevet n°.

98201555.4

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amining Division as requested by the applicant.  
Copies of the amended pages are annexed.

- [ ] The text notified under Rule 51(4) EPC has been amended using the replacement pages filed by the applicant.
- [ ] Form 2530 relating to filing a translation of the previous application is dispatched by the same post.

Anmeldung Nr./Application No./Demande n° // Patent Nr./Patent No./Brevet n°

98201555.4

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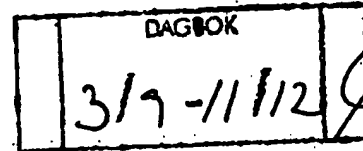
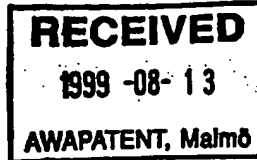
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H36

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200 71 Malmö  
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Application No. 98 201 555.4-2303	Ref. 2981378	Date 11.08.99
Applicant Välinge Aluminium AB		

**Communication under Rule 51(4) EPC**

You are hereby informed that the Examining Division intends to grant a European patent on the basis of the above application with the text and drawings as indicated below:

**Text for the Contracting States:**  
AT BE CH LI DE DK ES FR GB GR IE IT LU MC NL PT SE

**Description, pages:**

1-19 as originally filed

**Claims, No.:**

1-9 as originally filed

**Drawings, sheets:**

1-6 as originally filed

A copy of the relevant documents is enclosed.

The title of the invention in the three official languages of the European Patent Office, the international patent classification, the designated Contracting States and the registered name of the applicant are shown on the attached EPO Form 2056.

You are requested to state your approval of the text specified above within four months of this notification. Failure to do so will result in refusal of the application under Article 97(1) EPC, except as provided by Rule 51(5) EPC, second sentence.

The filing of a divisional application is only possible up to the approval of the text specified above (Rule 25(1) EPC). Concerning the possibility of a request for accelerated grant pursuant to Article 97(6) EPC, reference is made to OJ EPO 1995, 841.



Date

11.08.99

Sheet 2

Application-No.: 98 201 555.4

Further information concerning the acceptability of amendments or the filing of a separate set of claims for one or more designated Contracting States that have entered a reservation under Article 167(2)a) EPC will be found in the Guidelines for Examination in the EPO, C-VI, 4.8 - 4.10 and C-VI, 15.1.2 - 15.1.4.

If the translation of the priority document(s), as required by Article 88(1) EPC, or the declaration according to Rule 38(4) EPC has not yet been filed, it is to be filed within the time limit mentioned in Rule 38(4) EPC at the latest.



Himmel, U  
For the Examining Division  
Tel. No.: (+49-89) 2399-2449

Enclosure(s): Form 2056  
29 Copies of the relevant documents



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200 71 Malmö  
SUEDE

Application No. 98 201 555.4-2303	Ref. 2981378	Date 11.08.99
Applicant Välinge Aluminium AB		

For the intended grant of a European patent, (1) the title of the invention in the three official languages of the European Patent Office, (2) the International Patent Classification, (3) the designated Contracting States and (4) the applicant's registered name, address and country of residence or principal place of business are set out below.

- (1)
  - Ein aus einer Vielzahl von mechanisch miteinander verbundenen Paneelen zusammengesetzter Fussboden
  - A flooring system comprising a plurality of floor panels which are mechanically connected to each other
  - Plancher composé de panneaux de revêtement reliés mécaniquement les uns aux autres
- (2) E04F15/14, E04F15/02, E04F13/08
- (3) AT BE CH LI DE DK ES FR GB GR IE IT LU MC NL PT SE
- (4) Välinge Aluminium AB  
Kyrkogård 1  
260 40 Viken  
SE

The invention generally relates to a system for providing a joint along adjacent joint edges of two building panels, especially floor panels.

The invention is especially well suited for use in joining floor panels, especially thin laminated floors. Thus, the following description of the prior art and of the objects and features of the invention will be focused on this field of use. It should however be emphasised that the invention is useful also for joining ordinary wooden floors as well as other types of building panels, such as wall panels and roof slabs.

A joint, of the aforementioned type is known e.g. from SE 450,141. The first mechanical connection is achieved by means of joint edges having tongues and grooves. The locking device for the second mechanical connection comprises two oblique locking grooves, one in the rear side of each panel, and a plurality of spaced-apart spring clips which are distributed along the joint

H 15.05.99

FLOORING SYSTEMTechnical Field

The invention generally relates to a system for providing a joint along adjacent joint edges of two building panels, especially floor panels.

- 5 More specifically, the joint is of the type where the adjacent joint edges together form a first mechanical connection locking the joint edges to each other in a first direction at right angles to the principal plane of the panels, and where a locking device forms a second  
10 mechanical connection locking the panels to each other in a second direction parallel to the principal plane and at right angles to the joint edges, the locking device comprising a locking groove which extends parallel to and spaced from the joint edge of one of the panels, and said  
15 locking groove being open at the rear side of this one panel.

- The invention is especially well suited for use in joining floor panels, especially thin laminated floors. Thus, the following description of the prior art and of  
20 the objects and features of the invention will be focused on this field of use. It should however be emphasised that the invention is useful also for joining ordinary wooden floors as well as other types of building panels, such as wall panels and roof slabs.

25 Background of the Invention

- A joint of the aforementioned type is known e.g. from SE 450,141. The first mechanical connection is achieved by means of joint edges having tongues and grooves. The locking device for the second mechanical  
30 connection comprises two oblique locking grooves, one in the rear side of each panel, and a plurality of spaced-apart spring clips which are distributed along the joint

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and the legs of which are pressed into the grooves, and which are biased so as to tightly clamp the floor panels together. Such a joining technique is especially useful for joining thick floor panels to form surfaces of a considerable expanse.

Thin floor panels of a thickness of about 7-10 mm, especially laminated floors, have in a short time taken a substantial share of the market. All thin floor panels employed are laid as "floating floors" without being attached to the supporting structure. As a rule, the dimension of the floor panels is 200 x 1200 mm, and their long and short sides are formed with tongues and grooves. Traditionally, the floor is assembled by applying glue in the groove and forcing the floor panels together. The tongue is then glued in the groove of the other panel. As a rule, a laminated floor consists of an upper decorative wear layer of laminate having a thickness of about 1 mm, an intermediate core of particle board or other board, and a base layer to balance the construction. The core has essentially poorer properties than the laminate, e.g. in respect of hardness and water resistance, but it is nonetheless needed primarily for providing a groove and tongue for assemblage. This means that the overall thickness must be at least about 7 mm. These known laminated floors using glued tongue-and-groove joints however suffer from several inconveniences.

First, the requirement of an overall thickness of at least about 7 mm entails an undesirable restraint in connection with the laying of the floor, since it is easier to cope with low thresholds when using thin floor panels, and doors must often be adjusted in height to come clear of the floor laid. Moreover, manufacturing costs are directly linked with the consumption of material.

Second, the core must be made of moisture-absorbent material to permit using water-based glues when laying the floor. Therefore, it is not possible to make the floors thinner using so-called compact laminate, because

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of the absence of suitable gluing methods for such non-moisture-absorbent core materials.

Third, since the laminate layer of the laminated floors is highly wear-resistant, tool wear is a major problem when working the surface in connection with the formation of the tongue.

Fourth, the strength of the joint, based on a glued tongue-and-groove connection, is restricted by the properties of the core and of the glue as well as by the depth and height of the groove. The laying quality is entirely dependent on the gluing. In the event of poor gluing, the joint will open as a result of the tensile stresses which occur e.g. in connection with a change in air humidity.

Fifth, laying a floor with glued tongue-and-groove joints is time-consuming, in that glue must be applied to every panel on both the long and short sides thereof.

Sixth, it is not possible to disassemble a glued floor once laid, without having to break up the joints. Floor panels that have been taken up cannot therefore be used again. This is a drawback particularly in rental houses where the flat concerned must be put back into the initial state of occupancy. Nor can damaged or worn-out panels be replaced without extensive efforts, which would be particularly desirable on public premises and other areas where parts of the floor are subjected to great wear.

Seventh, known laminated floors are not suited for such use as involves a considerable risk of moisture penetrating down into the moisture-sensitive core.

Eighth, present-day hard, floating floors require, prior to laying the floor panels on hard subfloors, the laying of a separate underlay of floor board, felt, foam or the like, which is to damp impact sounds and to make the floor more pleasant to walk on. The placement of the underlay is a complicated operation, since the underlay

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must be placed in edge-to-edge fashion. Different underlays affect the properties of the floor.

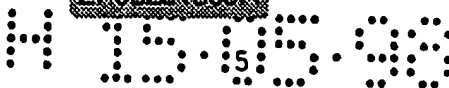
There is thus a strongly-felt need to overcome the above-mentioned drawbacks of the prior art. It is however not possible simply to use the known joining technique with glued tongues and grooves for very thin floors, e.g. with floor thicknesses of about 3 mm, since a joint based on a tongue-and-groove connection would not be sufficiently strong and practically impossible to produce for such thin floors. Nor are any other known joining techniques usable for such thin floors. Another reason why the making of thin floors from e.g. compact laminate involves problems is the thickness tolerances of the panels, being about 0.2-0.3 mm for a panel thickness of about 3 mm. A 3-mm compact laminate panel having such a thickness tolerance would have, if ground to uniform thickness on its rear side, an unsymmetrical design, entailing the risk of bulging. Moreover, if the panels have different thicknesses, this also means that the joint will be subjected to excessive load.

Nor is it possible to overcome the above-mentioned problems by using double-adhesive tape or the like on the undersides of the panels, since such a connection catches directly and does not allow for subsequent adjustment of the panels as is the case with ordinary gluing.

Using U-shaped clips of the type disclosed in the above-mentioned SE 450,141, or similar techniques, to overcome the drawbacks discussed above is no viable alternative either. Especially, biased clips of this type cannot be used for joining panels of such a small thickness as 3 mm. Normally, it is not possible to disassemble the floor panels without having access to their undersides. This known technology relying on clips suffers from the additional drawbacks:

- Subsequent adjustment of the panels in their longitudinal direction is a complicated operation in con-





nection with laying, since the clips urge the panels tightly against each other.

- Floor laying using clips is time-consuming.
- This technique is usable only in those cases where  
5 the floor panels are resting on underlying joists with the clips placed therebetween. For thin floors to be laid on a continuous, flat supporting structure, such clips cannot be used.
- The floor panels can be joined together only at  
10 their long sides. No clip connection is provided on the short sides.

#### Technical Problems and Objects of the Invention

A main object of the invention therefore is to provide a system for joining together building panels, especially floor panels for hard, floating floors, which  
15 allows using floor panels of a smaller overall thickness than present-day floor panels.

A particular object of the invention is to provide a panel-joining system which

- 20 - makes it possible in a simple, cheap and rational way to provide a joint between floor panels without requiring the use of glue, especially a joint based primarily only on mechanical connections between the panels;
- 25 - can be used for joining floor panels which have a smaller thickness than present-day laminated floors and which have, because of the use of a different core material, superior properties than present-day floors even at a thickness of 3 mm;
- 30 - makes it possible between thin floor panels to provide a joint that eliminates any unevennesses in the joint because of thickness tolerances of the panels;
- allows joining all the edges of the panels;
- reduces tool wear when manufacturing floor panels  
35 with hard surface layers;

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- allows repeated disassembly and reassembly of a floor previously laid, without causing damage to the panels, while ensuring high laying quality;
- makes it possible to provide moisture-proof floors;
- 5 - makes it possible to obviate the need of accurate, separate placement of an underlay before laying the floor panels; and
- considerably cuts the time for joining the panels.

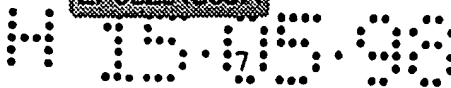
10 These and other objects of the invention are achieved by means of a panel-joining system having the features recited in the appended claims.

Thus, the invention provides a system for making a joint along adjacent joint edges of two building panels, especially floor panels, in which joint:

15 the adjacent joint edges together form a first mechanical connection locking the joint edges to each other in a first direction at right angles to the principal plane of the panels, and

a locking device arranged on the rear side of the  
20 panels forms a second mechanical connection locking the panels to each other in a second direction parallel to the principal plane and at right angles to the joint edges, said locking device comprising a locking groove  
25 of one of said panels, termed groove panel, and which is open at the rear side of the groove panel, said system being characterised in

that the locking device further comprises a strip  
integrated with the other of said panels, termed strip  
30 panel, said strip extending throughout substantially the entire length of the joint edge of the strip panel and being provided with a locking element projecting from the strip, such that when the panels are joined together, the strip projects on the rear side of the groove panel with  
35 its locking element received in the locking groove of the groove panel,



that the panels, when joined together, can occupy a relative position in said second direction where a play exists between the locking groove and a locking surface on the locking element that is facing the joint edges and is operative in said second mechanical connection,

that the first and the second mechanical connection both allow mutual displacement of the panels in the direction of the joint edges, and

that the second mechanical connection is so conceived as to allow the locking element to leave the locking groove if the groove panel is turned about its joint edge angularly away from the strip.

The term "rear side" as used above should be considered to comprise any side of the panel located behind/ underneath the front side of the panel. The opening plane of the locking groove of the groove panel can thus be located at a distance from the rear surface of the panel resting on the supporting structure. Moreover, the strip, which in the invention extends throughout substantially the entire length of the joint edge of the strip panel, should be considered to encompass both the case where the strip is a continuous, uninterrupted element, and the case where the "strip" consists in its longitudinal direction of several parts, together covering the main portion of the joint edge.

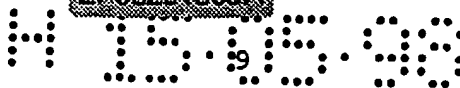
It should also be noted (i) that it is the first and the second mechanical connection as such that permit mutual displacement of the panels in the direction of the joint edges, and that (ii) it is the second mechanical connection as such that permits the locking element to leave the locking groove if the groove panel is turned about its joint edge angularly away from the strip. Within the scope of the invention, there may thus exist means, such as glue and mechanical devices, that can counteract or prevent such displacement and/or upward angling.

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The system according to the invention makes it possible to provide concealed, precise locking of both the short and long sides of the panels in hard, thin floors. The floor panels can be quickly and conveniently dis-  
5 assembled in the reverse order of laying without any risk of damage to the panels, ensuring at the same time a high laying quality. The panels can be assembled and dis-  
assembled much faster than in present-day systems, and any damaged or worn-out panels can be replaced by taking  
10 up and re-laying parts of the floor.

According to an especially preferred embodiment of the invention, a system is provided which permits precise joining of thin floor panels having, for example, a thickness of the order of 3 mm and which at the same time  
15 provides a tolerance-independent smooth top face at the joint. To this end, the strip is mounted in an equalising groove which is countersunk in the rear side of the strip panel and which exhibits an exact, predetermined distance  
20 from its bottom to the front side of the strip panel. The part of the strip projecting behind the groove panel engages a corresponding equalising groove, which is countersunk in the rear side of the groove panel and which exhibits the same exact, predetermined distance  
25 from its bottom to the front side of the groove panel. The thickness of the strip then is at least so great that the rear side of the strip is flush with, and preferably projects slightly below the rear side of the panels. In  
30 this embodiment, the panels will always rest, in the joint, with their equalising grooves on a strip. This levels out the tolerance and imparts the necessary strength to the joint. The strip transmits horizontal and upwardly-directed forces to the panels and downwardly-directed forces to the existing subfloor.

Preferably, the strip may consist of a material  
35 which is flexible, resilient and strong, and can be sawn. A preferred strip material is sheet aluminium. In an alu-



minium strip, sufficient strength can be achieved with a strip thickness of the order of 0.5 mm.

In order to permit taking up previously laid, joined floor panels in a simple way, a preferred embodiment of the invention is characterised in that when the groove panel is pressed against the strip panel in the second direction and is turned angularly away from the strip, the maximum distance between the axis of rotation of the groove panel and the locking surface of the locking groove closest to the joint edges is such that the locking element can leave the locking groove without contacting the locking surface of the locking groove. Such a disassembly can be achieved even if the aforementioned play between the locking groove and the locking surface is not greater than 0.2 mm.

According to the invention, the locking surface of the locking element is able to provide a sufficient locking function even with very small heights of the locking surface. Efficient locking of 3-mm floor panels can be achieved with a locking surface that is as low as 2 mm. Even a 0.5-mm-high locking surface may provide sufficient locking. The term "locking surface" as used herein relates to the part of the locking element engaging the locking groove to form the second mechanical connection.

For optimal function of the invention, the strip and the locking element should be formed on the strip panel with high precision. Especially, the locking surface of the locking element should be located at an exact distance from the joint edge of the strip panel.

Furthermore, the extent of the engagement in the floor panels should be minimised, since it reduces the floor strength.

By known manufacturing methods, it is possible to produce a strip with a locking pin, for example by extruding aluminium or plastics into a suitable section, which is thereafter glued to the floor panel or is inserted in special grooves. These and all other tradi-

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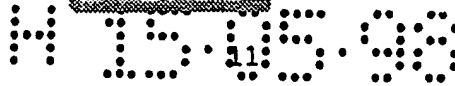
tional methods do however not ensure optimum function and an optimum level of economy. To produce the joint system according to the invention, the strip is suitably formed from sheet aluminium, and is mechanically fixed to the strip panel.

The laying of the panels can be performed by first placing the strip panel on the subfloor and then moving the groove panel with its long side up to the long side of the strip panel, at an angle between the principal plane of the groove panel and the subfloor. When the joint edges have been brought into engagement with each other to form the first mechanical connection, the groove panel is angled down so as to accommodate the locking element in the locking groove.

Laying can also be performed by first placing both the strip panel and the groove panel flat on the subfloor and then joining the panels parallel to their principal planes while bending the strip downwards until the locking element snaps up into the locking groove. This laying technique enables in particular mechanical locking of both the short and long sides of the floor panels. For example, the long sides can be joined together by using the first laying technique with downward angling of the groove panel, while the short sides are subsequently joined together by displacing the groove panel in its longitudinal direction until its short side is pressed on and locked to the short side of an adjacent panel in the same row.

In connection with their manufacture, the floor panels can be provided with an underlay of e.g. floor board, foam or felt. The underlay should preferably cover the strip such that the joint between the underlays is offset in relation to the joint between the floor panels.

The above and other features and advantages of the invention will appear from the appended claims and the following description of embodiments of the invention.



The invention will now be described in more detail hereinbelow with reference to the accompanying drawing Figures.

#### Description of Drawing Figures

5 Figs 1a and 1b schematically show in two stages how two floor panels of different thickness are joined together in floating fashion according to a first embodiment of the invention.

10 Figs 2a-c show in three stages a method for mechanically joining two floor panels according to a second embodiment of the invention.

Figs 3a-c show in three stages another method for mechanically joining the floor panels of Figs 2a-c.

15 2a-c as seen from below and from above, respectively.

Fig. 5 illustrates in perspective a method for laying and joining floor panels according to a third embodiment of the invention.

20 Fig. 6 shows in perspective and from below a first variant for mounting a strip on a floor panel.

Fig. 7 shows in section a second variant for mounting a strip on a floor panel.

#### Description of Preferred Embodiments

25 Figs 1a and 1b, to which reference is now made, illustrate a first floor panel 1, hereinafter termed strip panel, and a second floor panel 2, hereinafter termed groove panel. The terms "strip panel" and "groove panel" are merely intended to facilitate the description of the invention, the panels 1, 2 normally being identical in  
30 practice. The panels 1 and 2 may be made from compact laminate and may have a thickness of about 3 mm with a thickness tolerance of about  $\pm 0.2$  mm. Considering this thickness tolerance, the panels 1, 2 are illustrated with different thicknesses (Fig. 1b), the strip panel 1 having

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a maximum thickness (3.2 mm) and the groove panel 2 having a minimum thickness (2.8 mm).

To enable mechanical joining of the panels 1, 2 at opposing joint edges, generally designated 3 and 4, respectively, the panels are provided with grooves and strips as described in the following.

Reference is now made primarily to Figs 1a and 1b, and secondly to Figs 4a and 4b showing the basic design of the floor panels from below and from above, respectively.

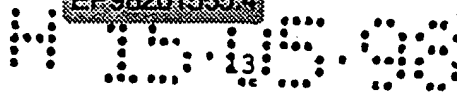
From the joint edge 3 of the strip panel 1, i.e. the one long side, projects horizontally a flat strip 6 mounted at the factory on the underside of the strip panel 1 and extending throughout the entire joint edge 3. The strip 6, which is made of flexible, resilient sheet aluminium, can be fixed mechanically, by means of glue or in any other suitable way. In Figs 1a and 1b, the strip 6 is glued, while in Figs 4a and 4b it is mounted by means of a mechanical connection, which will be described in more detail hereinbelow.

Other strip materials can be used, such as sheets of other metals, as well as aluminium or plastics sections. Alternatively, the strip 6 may be integrally formed with the strip panel 1. At any rate, the strip 6 should be integrated with the strip panel 1, i.e. it should not be mounted on the strip panel 1 in connection with laying. As a non-restrictive example, the strip 6 may have a width of about 30 mm and a thickness of about 0.5 mm.

As appears from Figs 4a and 4b, a similar, although shorter strip 6' is provided also at one short side 3' of the strip panel 1. The shorter strip 6' does however not extend throughout the entire short side 3' but is otherwise identical with the strip 6 and, therefore, is not described in more detail here.

The edge of the strip 6 facing away from the joint edge 3 is formed with a locking element 8 extended throughout the entire strip 6. The locking element 8 has





a locking surface 10 facing the joint edge 3 and having a height of e.g. 0.5 mm. The locking element 8 is so designed that when the floor is being laid and the strip panel 2 of Fig. 1a is pressed with its joint edge 4 against the joint edge 3 of the strip panel 1 and is angled down against the subfloor 12 according to Fig. 1b, it enters a locking groove 14 formed in the underside 16 of the groove panel 2 and extending parallel to and spaced from the joint edge 4. In Fig. 1b, the locking element 8 and the locking groove 14 together form a mechanical connection locking the panels 1, 2 to each other in the direction designated D2. More specifically, the locking surface 10 of the locking element 8 serves as a stop with respect to the surface of the locking groove 14 closest to the joint edge 4.

When the panels 1 and 2 are joined together, they can however occupy such a relative position in the direction D2 that there is a small play  $\Delta$  between the locking surface 10 and the locking groove 14. This mechanical connection in the direction D2 allows mutual displacement of the panels 1, 2 in the direction of the joint, which considerably facilitates the laying and enables joining together the short sides by snap action.

As appears from Figs 4a and 4b, each panel in the system has a strip-6 at one long side 3 and a locking groove 14 at the other long side 4, as well as a strip 6' at one short side 3' and a locking groove 14' at the other short side 4'.

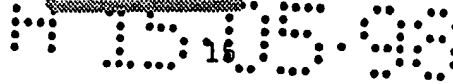
Furthermore, the joint edge 3 of the strip panel 1 has in its underside 18 a recess 20 extending throughout the entire joint edge 3 and forming together with the upper face 22 of the strip 6 a laterally open recess 24. The joint edge 4 of the groove panel 2 has in its top side 26 a corresponding recess 28 forming a locking tongue 30 to be accommodated in the recess 24 so as to form a mechanical connection locking the joint edges 3, 4 to each other in the direction designated D1. This con-

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nection can be achieved with other designs of the joint edges 3, 4, for example by a bevel thereof such that the joint edge 4 of the groove panel 2 passes obliquely in underneath the joint edge 3 of the strip panel 1 to be  
5 locked between that edge and the strip 6.

The panels 1, 2 can be taken up in the reverse order of laying without causing any damage to the joint, and be laid again.

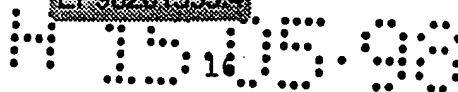
The strip 6 is mounted in a tolerance-equalising  
10 groove 40 in the underside 18 of the strip panel 1 adjacent the joint edge 3. In this embodiment, the width of the equalising groove 40 is approximately equal to half the width of the strip 6, i.e. about 15 mm. By means of the equalising groove 40, it is ensured that there will  
15 always exist between the top side 21 of the panel 1 and the bottom of the groove 40 an exact, predetermined distance E which is slightly smaller than the minimum thickness (2.8 mm) of the floor panels 1, 2. The groove panel  
20 2 has a corresponding tolerance-equalising surface or groove 42 in the underside 16 of the joint edge 4. The distance between the equalising surface 42 and the top side 26 of the groove panel 2 is equal to the aforementioned exact distance E. Further, the thickness of the  
25 strip 6 is so chosen that the underside 44 of the strip is situated slightly below the undersides 18 and 16 of the floor panels 1 and 2, respectively. In this manner, the entire joint will rest on the strip 6, and all vertical downwardly-directed forces will be efficiently  
30 transmitted to the subfloor 12 without any stresses being exerted on the joint edges 3, 4. Thanks to the provision of the equalising grooves 40, 42, an entirely even joint will be achieved on the top side, despite the thickness tolerances of the panels 1, 2, without having to perform any grinding or the like across the whole panels.  
35 Especially, this obviates the risk of damage to the bottom layer of the compact laminate, which might give rise to bulging of the panels.



Reference is now made to the embodiment of Figs 2a-c showing in a succession substantially the same laying method as in Figs 1a and 1b. The embodiment of Figs 2a-c primarily differs from the embodiment of Figs 1a and 1b in that the strip 6 is mounted on the strip panel 1 by means of a mechanical connection instead of glue. To provide this mechanical connection, illustrated in more detail in Fig. 6, a groove 50 is provided in the underside 18 of the strip panel 1 at a distance from the recess 24. The groove 50 may be formed either as a continuous groove extending throughout the entire length of the panel 1, or as a number of separate grooves. The groove 50 defines, together with the recess 24, a dovetail gripping edge 52, the underside of which exhibits an exact equalising distance E to the top side 21 of the strip panel 1. The aluminium strip 6 has a number of punched and bent tongues 54, as well as one or more lips 56 which are bent round opposite sides of the gripping edge 52 in clamping engagement therewith. This connection is shown in detail from below in the perspective view of Fig. 6.

Alternatively, a mechanical connection between the strip 6 and the strip panel 1 can be provided as illustrated in Fig. 7 showing in section a cut-away part of the strip panel 1 turned upside down. In Fig. 7, the mechanical connection comprises a dovetail recess 58 in the underside 18 of the strip panel 1, as well as tongues/lips 60 punched and bent from the strip 6 and clamping against opposing inner sides of the recess 58.

The embodiment of Figs 2a-c is further characterised in that the locking element 8 of the strip 6 is designed as a component bent from the aluminium sheet and having an operative locking surface 10 extending at right angles up from the front side 22 of the strip 6 through a height of e.g. 0.5 mm, and a rounded guide surface 34 facilitating the insertion of the locking element 8 into the locking groove 14 when angling down the groove panel 2 towards the subfloor 12 (Fig. 2b), as well as a portion 36

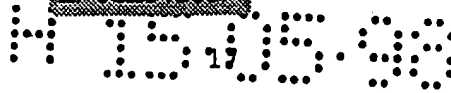


which is inclined towards the subfloor 12 and which is not operative in the laying method illustrated in Figs 2a-c.

Further, it can be seen from Figs 2a-c that the joint edge 3 of the strip panel 1 has a lower bevel 70 which cooperates during laying with a corresponding upper bevel 72 of the joint edge 4 of the groove panel 2, such that the panels 1 and 2 are forced to move vertically towards each other when their joint edges 3, 4 are moved up to each other and the panels are pressed together horizontally.

Preferably, the locking surface 10 is so located relative to the joint edge 3 that when the groove panel 2, starting from the joined position in Fig. 2c, is pressed horizontally in the direction D2 against the strip panel 1 and is turned angularly up from the strip 6, the maximum distance between the axis of rotation A of the groove panel 2 and the locking surface 10 of the locking groove is such that the locking element 8 can leave the locking groove 14 without coming into contact with it.

Figs 3a-3b show another joining method for mechanically joining together the floor panels of Figs 2a-c. The method illustrated in Figs 3a-c relies on the fact that the strip 6 is resilient and is especially useful for joining together the short sides of floor panels which have already been joined along one long side as illustrated in Figs 2a-c. The method of Figs 3a-c is performed by first placing the two panels 1 and 2 flat on the subfloor 12 and then moving them horizontally towards each other according to Fig. 3b. The inclined portion 36 of the locking element 8 then serves as a guide surface which guides the joint edge 4 of the groove panel 2 up on to the upper side 22 of the strip 6. The strip 6 will then be urged downwards while the locking element 8 is sliding on the equalising surface 42. When the joint edges 3, 4 have been brought into complete engagement

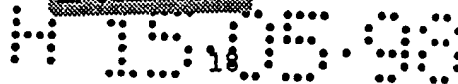


with each other horizontally, the locking element 8 will snap into the locking groove 14 (Fig. 3c), thereby providing the same locking as in Fig. 2c. The same locking method can also be used by placing, in the initial position, the joint edge 4 of the groove panel with the equalising groove 42 on the locking element 10 (Fig. 3a). The inclined portion 36 of the locking element 10 then is not operative. This technique thus makes it possible to lock the floor panels mechanically in all directions, and by repeating the laying operations the whole floor can be laid without using any glue.

The invention is not restricted to the preferred embodiments described above and illustrated in the drawings, but several variants and modifications thereof are conceivable within the scope of the appended claims. The strip 6 can be divided into small sections covering the major part of the joint length. Further, the thickness of the strip 6 may vary throughout its width. All strips, locking grooves, locking elements and recesses are so dimensioned as to enable laying the floor panels with flat top sides in a manner to rest on the strip 6 in the joint. If the floor panels consist of compact laminate and if silicone or any other sealing compound, a rubber strip or any other sealing device is applied prior to laying between the flat projecting part of the strip 6 and the groove panel 2 and/or in the recess 26, a moisture-proof floor is obtained.

As appears from Fig. 6, an underlay 46, e.g. of floor board, foam or felt, can be mounted on the underside of the panels during the manufacture thereof. In one embodiment, the underlay 46 covers the strip 6 up to the locking element 8, such that the joint between the underlays 46 becomes offset in relation to the joint between the joint edges 3 and 4.

In the embodiment of Fig. 5, the strip 6 and its locking element 8 are integrally formed with the strip panel 1, the projecting part of the strip 6 thus forming



an extension of the lower part of the joint edge 3. The locking function is the same as in the embodiments described above. On the underside 18 of the strip panel 1, there is provided a separate strip, band or the like 74 extending throughout the entire length of the joint and having, in this embodiment, a width covering approximately the same surface as the separate strip 6 of the previous embodiments. The strip 74 can be provided directly on the rear side 18 or in a recess formed therein (not shown), so that the distance from the front side 21, 26 of the floor to the rear side 76, including the thickness of the strip 74, always is at least equal to the corresponding distance in the panel having the greatest thickness tolerance. The panels 1, 2 will then rest, in the joint, on the strip 74 or only on the undersides 18, 16 of the panels, if these sides are made plane.

When using a material which does not permit downward bending of the strip 6 or the locking element 8, laying can be performed in the way shown in Fig. 5. A floor panel 2a is moved angled upwardly with its long side 4a into engagement with the long side 3 of a previously laid floor panel 1 while at the same time a third floor panel 2b is moved with its short side 4b' into engagement with the short side 3a' of the upwardly-angled floor panel 2a and is fastened by angling the panel 2b downwards. The panel 2b is then pushed along the short side 3a' of the upwardly-angled floor panel 2a until its long side 4b encounters the long side 3 of the initially-laid panel 1. The two upwardly-angled panels 2a and 2b are therefore angled down on to the subfloor 12 so as to bring about locking.

By a reverse procedure the panels can be taken up in the reverse order of laying without causing any damage to the joint, and be laid again.

Several variants of preferred laying methods are conceivable. For example, the strip panel can be inserted under the groove panel, thus enabling the laying of pan-

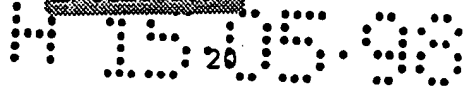
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els in all four directions with respect to the initial position.



## CLAIMS

1. A flooring system, comprising a plurality of rectangular floor panels (1, 2), which are mechanically connectable to each other in parallel rows along adjacent long edges (3, 4) and short edges (3', 4'), respectively, of the panels, said floor panels being provided with means for mechanically locking together their long edges (3, 4) as well as their short edges (3', 4') in a first direction (D1) at right angles to the principal plane of the panels, thereby forming first mechanical connections between the panels (1, 2),

characterised in

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that each panel, at a rear side thereof, being provided:

(i) with a locking strip (6, 6') at one long edge (3) and at one short edge (3'), each locking strip (6, 6') being integrally formed in one piece with the panel (1, 2) and forming an extension of a lower part of the corresponding edge of the panel (1, 2) and extending throughout substantially the entire length of the corresponding edge of the panel and being provided with a projecting locking-element (8), and

(ii) with a locking groove (14, 14') at an opposite long edge (4) and at an opposite short edge (4'), each locking groove (14, 14') extending parallel to and spaced from the corresponding edge (4, 4') and being open at a rear side of the panel (1, 2), said locking strips (6, 6') and locking grooves (14, 14') forming second mechanical connections locking the panels to each other in a second direction (D2) parallel to the principal plane and at right angles to the joint edges (3, 4; 3', 4'), such that a strip (6, 6') of a first one (1) of two joined panels projects on the rear side of the second



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panel with its locking element (8) received in the locking groove (14, 14') of the second panel (2),

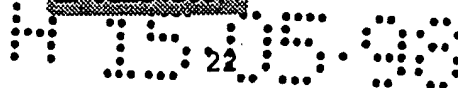
that the first mechanical connection allows mutual displacement of the panels (1, 2) in the direction of the long edges (3, 4),

that the panels, when joined together along their long edges (3, 4), can occupy a relative position in said second direction (D2) where a play ( $\Delta$ ) exists between the locking groove (14) and a locking surface (10) on the locking element (8) that is facing the long edges (3, 4), such that also the second mechanical connection allow mutual displacement of the panels (1, 2) in the direction of the long edges (3, 4),

that the second mechanical connection along the long edges (3, 4) is so conceived as to allow the locking element (8) to leave the locking groove (14) if the panel (2) associated with the locking groove (14) is turned about its long edge (4) angularly away from the strip (6), and

that each locking strip (6') at the short edges (3', 4') is flexible and resilient such that two panels (1, 2), having already been mechanically joined to a common long edge of a third panel, can be mechanically joined together at their adjacent short edges (3', 4') by displacing said two panels horizontally towards each other, while resiliently urging the flexible strip (6') at one (3') of said short edges downwards, until said adjacent short edges (3', 4') of the two panels (1, 2) have been brought into complete engagement with each other horizontally and the locking element (8) at said one short edge (3') thereby snaps into the locking groove (14') at the second short edge (4').

2. A flooring system as claimed in claim 1, characterised in that the first mechanical connection as well as the second mechanical connection along the long edges (3, 4) are such that they allow the



locking element (8) to enter the locking groove (14) if the panel (2) associated with the groove (14) is turned about its joint edge (4) angularly towards the strip (6) while holding the upper part of the joint edge (4) of the panel (2) associated with the groove in contact with the upper part of the joint edge (3) of the adjacent panel (1) associated with the strip.

3. A flooring system as claimed in claim 1 or 2, characterised in that the first mechanical connection as well as the second mechanical connection along the long edges (3, 4) are such that they allow the locking element (8) to leave the locking groove (14) if the panel (2) associated with the groove is turned about its joint edge (4) angularly away from the strip (6) while holding the upper part of the joint edge (4) of the panel (2) associated with the groove in contact with the upper part of the joint edge (3) of the adjacent panel (1) associated with the strip.

4. A flooring system as claimed in any one of the preceding claims, characterised in that, in order to resiliently urging the flexible strip (6') downwards while displacing said adjacent short edges (3', 4') horizontally towards each other, said adjacent short edges (3', 4') being provided with cooperating lower and upper bevels (70, 72), such that the panels (1, 2) are forced to move vertically towards each other when their adjacent short edges (3', 4') are moved up to each other and the panels (1, 2) are pressed together horizontally.

5. A flooring system as claimed in any one of the preceding claims, characterised in that the locking surface (10) of the locking element (8) is extended from the front side (22) of the strip (6, 6') through a height in said first direction that is less than or equal to 2 mm.

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6. A flooring system as claimed in any one of the preceding claims, characterised in that the locking element (8) consists of a locking edge extended continuously along the strip (6, 6').

7. A flooring system as claimed in any one of the preceding claims, characterised in that an underlay (46) of floor boards, foam, felt or the like is fixed to the rear sides (18, 16) of the panels (1, 2).

8. A flooring system as claimed in claim 7, characterised in that the underlay (46) is fixed so as to cover the strip (6, 6') in said second direction at least up to the locking element (8), such that a joint between the underlays (46) of the two adjacent panels (1, 2) is offset in said second direction relative to the joint edges (3, 4; 3', 4').

9. A system as claimed in any one of the preceding claims, characterised in that a sealing means, such as a sealing compound, a rubber strip or the like, is provided on the front side (22) of the strip (6, 6') between the locking element (8) and the joint edge (3, 3') of the panel (1) associated with the strip to seal against the other panel (2).

Fig. 1a

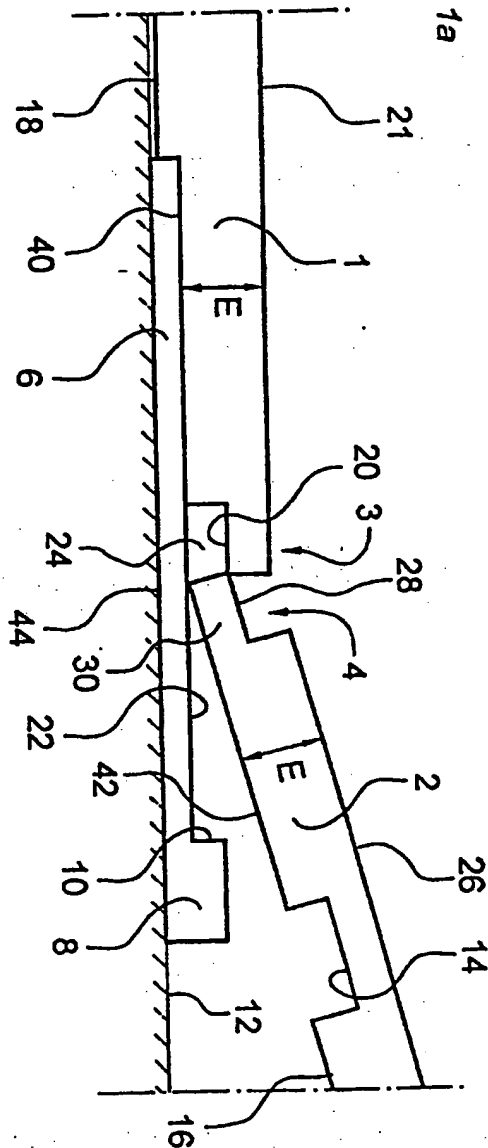
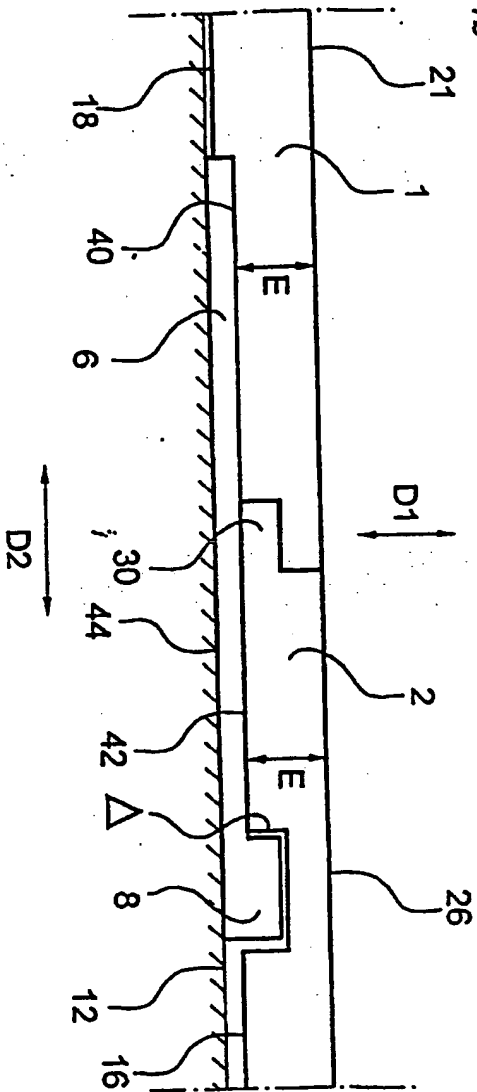


Fig. 1b



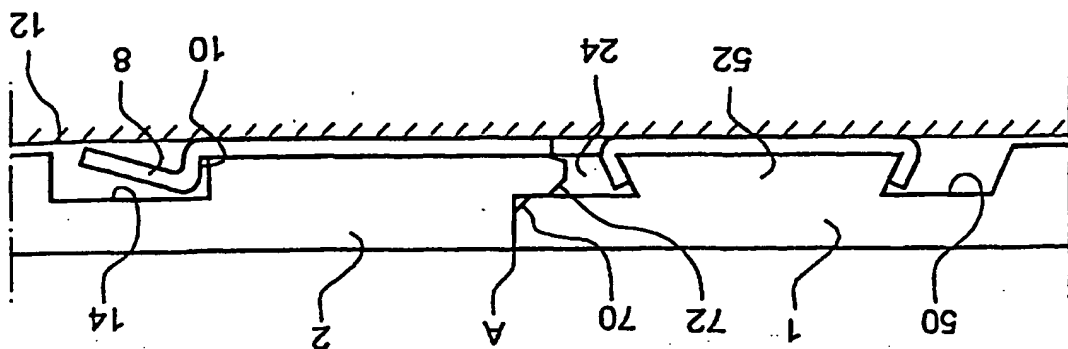


Fig. 2c

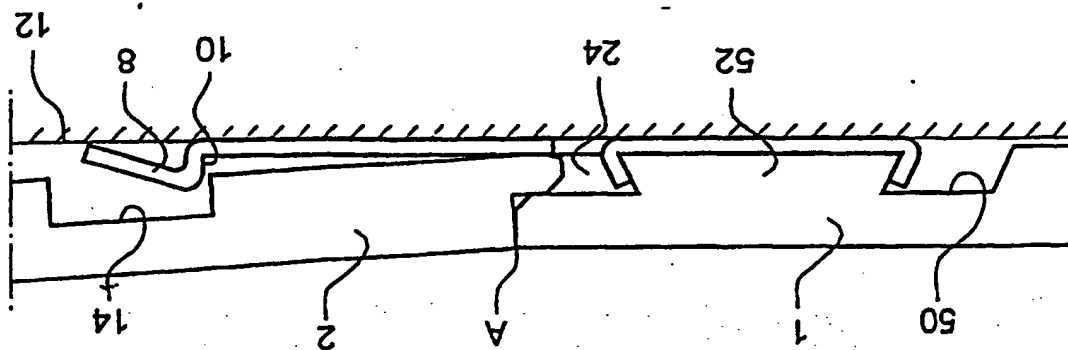


Fig. 2b

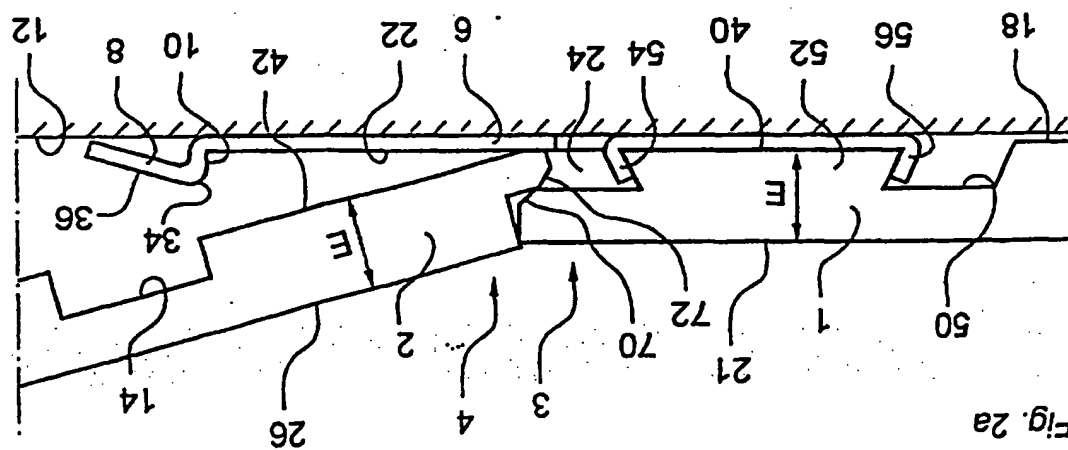


Fig. 2a

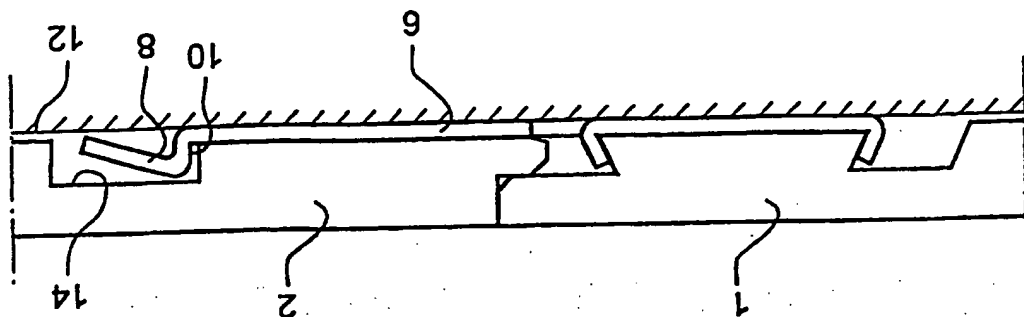


Fig. 3c

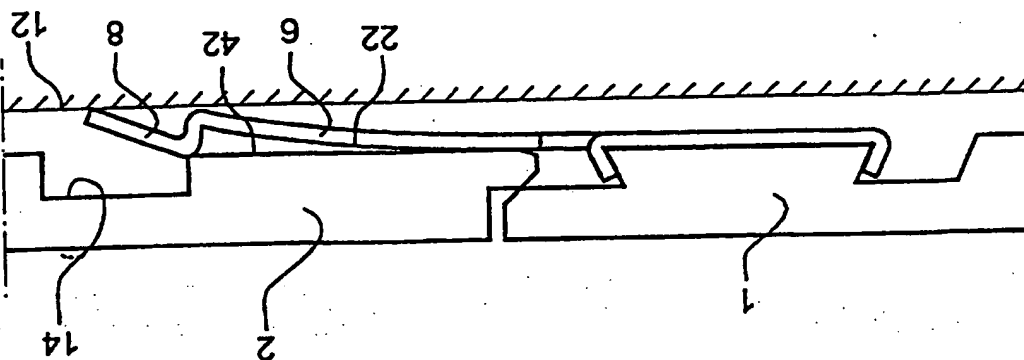


Fig. 3b

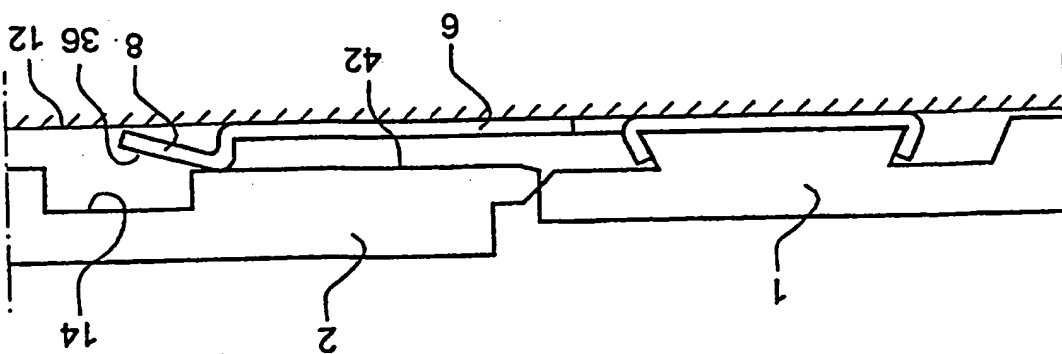


Fig. 3a

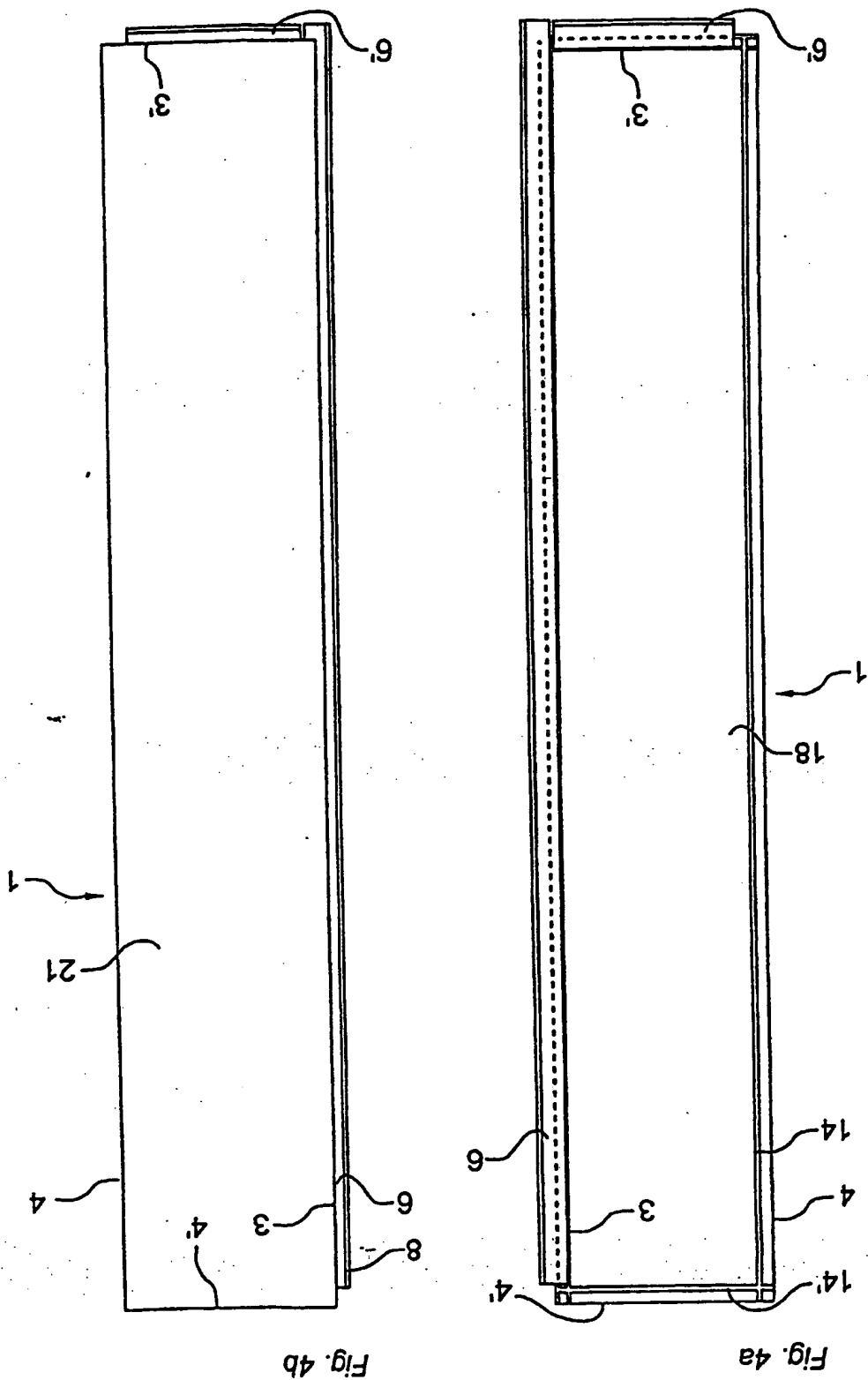
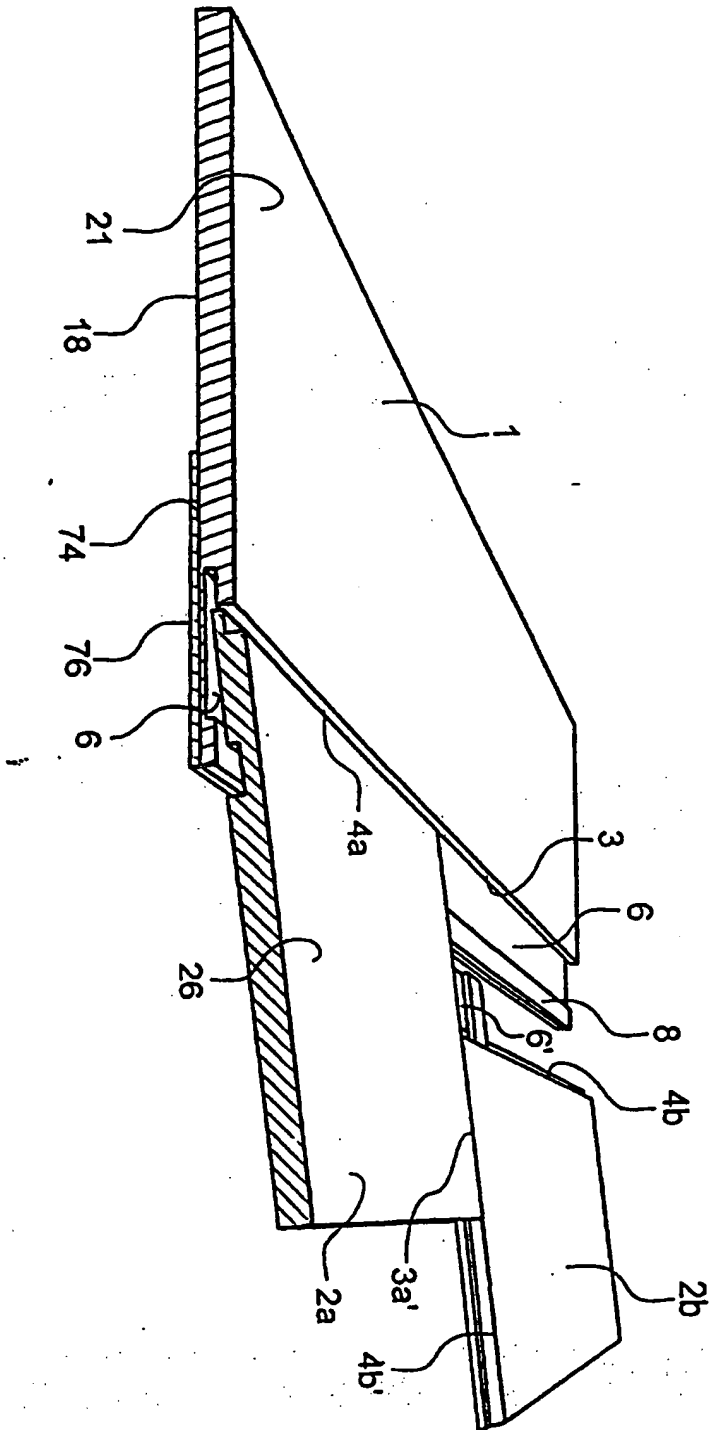


Fig. 4a

Fig. 4b

Fig. 5





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Fig. 6

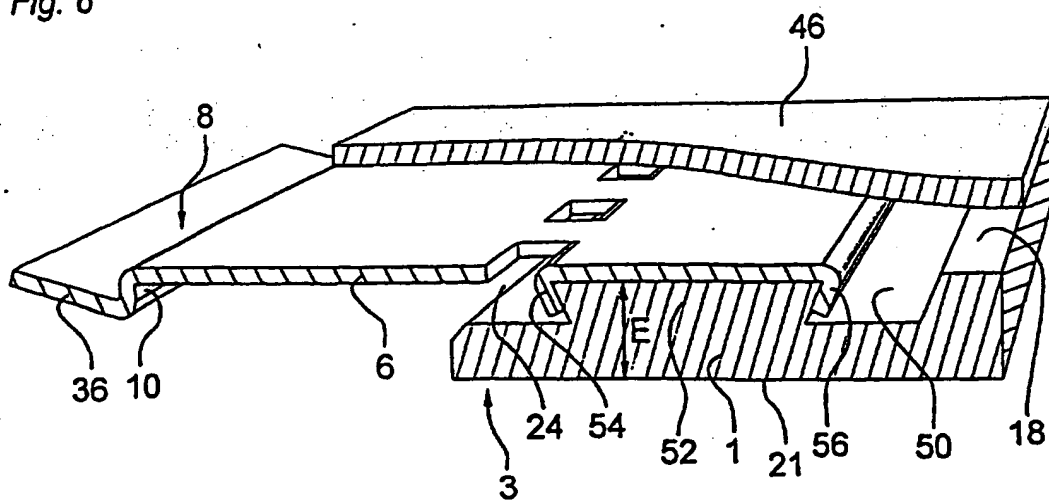
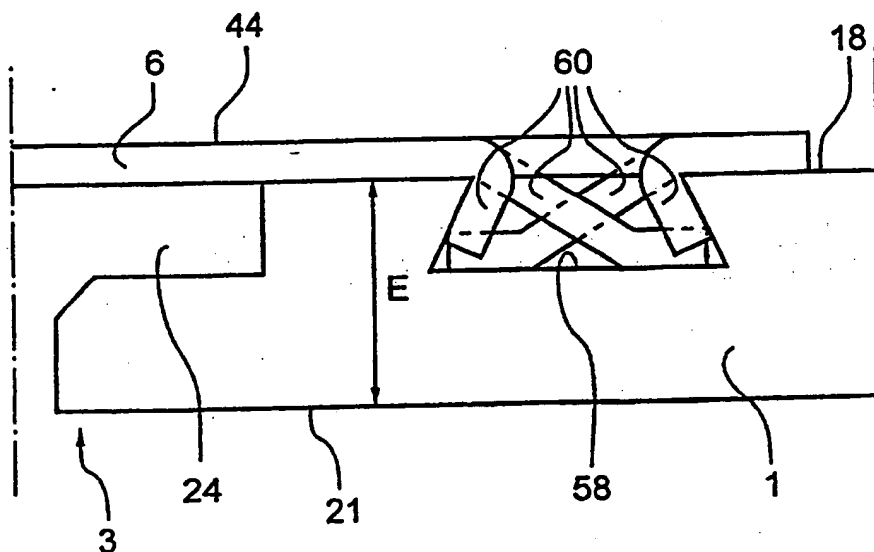


Fig. 7



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Anschrift • Address • Adresse

Françoise IDE, Formalities Officer

Tel: +49 89 2399 2449

Fax:

Bemerkungen • Remarks • Remarques

EP applications 98106535.2-2303 and 98201555.4-2303 in the name  
of Vålinge Aluminium AB

Reference is made to our telephone conversation.

Please find attached a copy via fax of the EPO Form 2004 for both  
applications.

The original letters will leave the EPO per registered mail on 11/08/99.

Best regards and nice weekend.

6.08.1999

Datum • Date

Unterschrift • Signature

6. AUG. 1999 14:34

EPA-PCT MUENCHEN 089/2399-2740

NR. 8019 S. 4/5



☐ EPA/EPO/OEB  
 D-80286 München  
 ☌ 49 89 2399-0  
 TX 523 056 epma d  
 FAX 49 89 2399-4465

Europäisches  
 Patentamt

Generaldirektion 2

European  
 Patent Office

Directorate General 2

Office européen  
 des brevets

Direction Générale 2

Giver, Sören Bo  
 Awapatent AB,  
 P.O. Box 5117  
 200 71 Malmö  
 SUEDE

DAGBOK			
11/1	3/9	11/12	OK



Application No. 98 201 555.4-2303	Ref. 2981378	Date 11. 08. 99
Applicant Välinge Aluminium AB		

#### Communication under Rule 51(4) EPC

You are hereby informed that the Examining Division intends to grant a European patent on the basis of the above application with the text and drawings as indicated below:

#### Text for the Contracting States:

AT BE CH LI DE DK ES FR GB GR IE IT LU MC NL PT SE

#### Description, pages:

1-19 as originally filed

#### Claims, No.:

1-9 as originally filed

#### Drawings, sheets:

1-6 as originally filed

A copy of the relevant documents is enclosed.

The title of the invention in the three official languages of the European Patent Office, the international patent classification, the designated Contracting States and the registered name of the applicant are shown on the attached EPO Form 2056.

You are requested to state your approval of the text specified above within four months of this notification. Failure to do so will result in refusal of the application under Article 97(1) EPC, except as provided by Rule 51(5) EPC, second sentence.

The filing of a divisional application is only possible up to the approval of the text specified above (Rule 25(1) EPC). Concerning the possibility of a request for accelerated grant pursuant to Article 97(6) EPC, reference is made to OJ EPO 1995, 841.

6. AUG. 1999 14:34

EPA-PCT MUENCHEN 089/2399-2740

NR. 8019 S. 5/5



Date

1 1. 08. 99

Sheet 2

Application-No.: 98 201 555.4

Further information concerning the acceptability of amendments or the filing of a separate set of claims for one or more designated Contracting States that have entered a reservation under Article 167(2)a) EPC will be found in the Guidelines for Examination in the EPO, C-VI, 4.8 - 4.10 and C-VI, 15.1.2 - 15.1.4.

If the translation of the priority document(s), as required by Article 88(1) EPC, or the declaration according to Rule 38(4) EPC has not yet been filed, it is to be filed within the time limit mentioned in Rule 38(4) EPC at the latest.



Himmel, U  
For the Examining Division  
Tel. No.: (+49-89) 2399-2449

Enclosure(s): Form 2056  
2.9 Copies of the relevant documents

**AWAPATENT**Helsingborg  
11 June 1999Our ref.  
EP-2981378Handled by  
Sören Giver/MYAttention  
DG 2EUROPEAN PATENT OFFICE  
D-80298 MÜNCHEN**SENT BY REGISTERED MAIL**

European Patent Application No 98201555.4-2320  
in the name of **VÄLINGE ALUMINIUM AB**  
Divisional of EP 0 698 162

Dear Sirs,

This is in response to your Communication dated 1 June 1999.

The present application is a divisional application, based on parent application  
No. 94915725.9.

Referring to the objection set out in your Communication, it is respectfully submitted that  
there should be no double patenting problems in the present case for the following reasons:

Parent application EP 0 698 162 (now granted) includes claims 1-22 of which all are directed  
to a system for providing a joint along adjacent joint edges of two building panels. Claim 1 is  
the only independent claim.

The other pending divisional application EP 0 855 482 does not include any apparatus claims.  
It includes method claims only, directed essentially to methods for mechanically assembling  
floor panels. Thus, the parent application and EP 0 855 482 relate to different inventions,  
although these inventions presents some common features.

**HELINGBORG**

VAT No. SE556082702301

STREET ADDRESS:  
Berga allé 1  
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SWEDENPOSTAL ADDRESS:  
Berga allé 1  
S-254 52 HELINGBORG  
SWEDENTelephone +46 42 16 30 45  
Fax +46 42 16 09 42  
Email mail@awapatent.com**Other AWAPATENT offices:**MALMÖ (Head office and registered office)  
STOCKHOLM GÖTEBORG  
SÖDERHAMN VÄXJÖ  
LIDKÖPING VARBERO  
ÖSTERSUND

The present divisional application EP 0 877 130 includes claims 1-9 directed to a flooring system, comprising a plurality of rectangular floor panels, which are mechanically connectable to each other. There is only one independent claim.

According to EPO's Guidelines, a European parent application and a European divisional application may not claim the subject-matter. It is also stated in the Guidelines that one application may claim its own subject-matter in combination with that of the other application.

Furthermore, in BoA Decision T 91/118, point 2.4.1, the Board states that it can find no support for the contention that features forming part of the subject-matter of the divisional application cannot be the subject of a dependent claim in the parent application.

In the present case, the situation is as follows:

In the parent application, (i) the embodiment wherein the strip is formed as a separate component fixedly connected to the panel body forms the subject-matter of claim 5, whereas (ii) the embodiment wherein the strip is integrally formed with the panel body, i.e. formed in one piece therewith forms the subject-matter of claim 14. Claim 5 is only dependent from any of claims 1-4. Claim 14 is only dependent from any one of claims 1-4.

Furthermore, the parent application includes a claim 13 directed to an embodiment wherein the strip is made of a flexible, preferably resilient material. However, claim 13 is only dependent from any one of claims 5-12.

Thus, the claims of the parent application does not claim the combination of the subject-matter in claim 1 plus the subject-matter of claim 14 ("one-piece embodiment") plus the feature that the strip is made of a flexible, preferably resilient material. This combination of features is what is claimed in claim 1 in the present divisional application. Accordingly, it is respectfully submitted that the parent application and the present divisional application does not claim the same subject-matter, although some features forming part of the subject-matter of the divisional application are the subject of different claims in the parent application.

As to the necessary support in the parent application (Article 76, EPC), it is stated in the parent application (page 8, line 34) that the strip may consist of a material which is flexible and resilient.

Yours faithfully,



Sören Giver,  
Authorised Representative  
AWAPATENT AB



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Generaldirektion 2

European  
Patent Office

Directorate General 2

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des brevets

Direction Générale 2

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200 71 Malmö

RECEIVED  
1999-05-08  
AWAPATENT, Malmö

RECEIVED

1999-06-04

AWAPATENT, Malmö

Telephone Numbers:

Primary Examiner (+49-89) 2399-2486  
(substantive examination)

Formalities Officer / Assistant (+49-89) 2399-2438  
(Formalities and other matters)



Application No. 98 201 555.4-2303	Ref. 2981378	Date 01.06.99
Applicant Vällinge Aluminium AB		

DAGBOK

Communication pursuant to Article 96(2) and Rule 51(2) EPC

The examination of the above-identified application has revealed that it does not meet the requirements of the European Patent Convention for the reasons enclosed herewith. If the deficiencies indicated are not rectified the application may be refused pursuant to Article 97(1) EPC.

You are invited to file your observations and insofar as the deficiencies are such as to be rectifiable, to correct the indicated deficiencies within a period

of 4 months

from the notification of this communication, this period being computed in accordance with Rules 78(3) and 83(2) and (4) EPC.

Amendments to the description, claims and drawings are to be filed where appropriate within the said period in three copies on separate sheets (Rule 38(1) EPC).

Failure to comply with this invitation in due time will result in the application being deemed to be withdrawn (Article 96(3) EPC).



PLUGGEHB  
Primary Examiner  
for the Examining Division

Enclosure(s): 1 page/s reasons (Form 2906)





Bescheid/Protokoll (Anlage)

Communication/Minutes (Annex)

Notification/Procès-verbal (Annexe)

Datum  
Date  
Date

01.03.99

Blatt  
Sheet  
Feuille

1

Anmalk-Nr.:  
Application No.:  
Demande n°:

98 201 555.4

The examination is being carried out on the following application documents:

Text for the Contracting States:

AT BE CH LI DE DK ES FR GB GR IE IT LU MC NL PT SE

**Description, pages:**

1-19 as originally filed

**Claims, No.:**

1-9 as originally filed

**Drawings, sheets:**

1-6 as originally filed

1. The present application claims priority to 10.5.1993 (SE9301595), as does pending divisional application EP0855482 and its parent EP0698162.

As set out in the Guidelines, the Convention does not deal explicitly with the case of co-pending European applications of the same effective date. However, it is an accepted principle in most patent systems that two patents shall not be granted to the same applicant for one invention. It is permissible to proceed with two applications having the same description where the claims are quite distinct in scope and directed to different inventions.

In the present case, there are three European applications from the same applicant designating the same States and the claims of those applications have the same priority date and relate to essentially the same invention, at least in respect of the present application and EP0698162.

The applicant is requested to amend the present application in such a manner that it no longer claims the same invention, and to indicate clearly the differences between the presently claimed invention and that of EP0698162.



P.B. 5818 - Patentlaan 2  
2280 HV Rijswijk (ZH)  
☎ (070) 3 40 20 40  
TX 31651 epo nl  
FAX (070) 3 40 30 16

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Patentamt

Eingangs-  
stelle

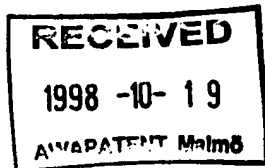
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Section de  
Dépôt

Giver, Sören Bo  
Awapatent AB,  
P.O. Box 5117  
200 71 Malmö  
SUEDE



→ Hbg.  
Mo.  
Datum/Date  
12/10/98

Nummer/Ref./RM.	Anmeldung Nr./Application No./Demande n°/Patent Nr./Patent No./Brevet n°.
2981378	98201555.4-2303
Anmelder/Applicant/Demandeur/Patentinhaber/Proprietor/Titulaire Välinge Aluminium AB	

#### REFUND OF FEES

The following fees were paid in respect of the application 98201555.4

Fee	Code	Voucher No	Date	Currency	Amount
SEARCH FEE	002	00594113	12/05/98	DEM	1 700,00

#### REFUND ORDER

1. According to Art. 10 Rules relating to Fees (compare also OJ EPO 1980, 112) 50 % of the search fee will be refunded.
2. The refund will be done by :  
CREDIT OF THE AMOUNT DUE TO THE DEPOSIT ACCOUNT NO.  
28100022 - AWAPATENT AB

Sum refundable	:	Code	Currency	Amount	Voucher No
		002	DEM	850,00	697203

The Authorising Officer  
SCHUBERT K P  
(070)3402979



Original lämnad till AW / Mo.

**AWAPATENT**Handläggs av  
Sören Giver/MPHelsingborg  
1998-10-07Vår referens  
2981378Attention  
DG 2

European Patent Office

D-80298 MÜNCHEN

SENT BY FAX (089) 23 99 4465

**VÄLINGE ALUMINIUM AB**  
European Patent Application No. 98201555.4  
Publication No. 877 130

Dear Sirs,

An accelerated examination under the PACE program is hereby respectfully requested in the above-identified case.

Very truly yours,

Sören Giver  
Authorised Representative  
AWAPATENT AB

HELSINGBORG

Org. nr. 556082-7023

Övriga AWAPATENT-kontor:

GATUADRESS:  
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HELSINGBORGPOSTADRESS:  
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mail@awapatent.comMALMÖ (Huvudkontor och styrelsens säte)  
STOCKHOLM  
SÖDERHAMN  
LIDKÖPING  
ÖSTERSUND  
GÖTEBORG  
VÄXJÖ  
VARBERG  
LUND



P.B. 5818 - Patentaan 2  
2280 HV Rijswijk (ZH)  
T (070) 3 40 20 40  
TX 31851 epo nl  
FAX (070) 3 40 30 18

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Patentamt

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stelle

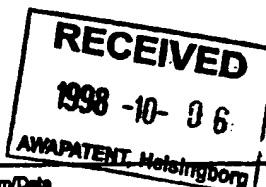
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Giver, Sören Bo  
Awapatent AB,  
P.O. Box 5117  
200 71 Malmö  
SUEDE



Datum/Date  
30/09/98

her/Ref./Réf. 2981378	Anmeldung Nr./Application No./Demande n°/Patent Nr./Patent No./Brevet n° 98201555.4-2303 / 0877130
Anmelder/Applicant/Demandeur/Patentinhaber/Propriétaire/Titulaire Välinge Aluminium AB	

**NOTIFICATION OF EUROPEAN PUBLICATION NUMBER AND INFORMATION ON THE APPLICATION OF ARTICLE 67(3) EPC**

The Receiving Section hereby informs you that the technical preparations for publication of the above-mentioned European patent application have been completed.

The provisional protection under Art. 67(1) and (2) EPC in the individual Contracting States becomes effective only when the conditions referred to in Art. 67(3) EPC have been fulfilled (for further information, see EPO brochure "National Law relating to the EPC").

This application will be published on 11.11.98 without the European search report. The publication will be mentioned in European Patent Bulletin number 1998/46

The publication number is: 0877130

The amended title of the invention in the three official languages of the European Patent Office is worded as follows:

Ein aus einer Vielzahl von mechanisch miteinander verbundenen  
Paneelen zusammengesetzter Fussboden

A flooring system comprising a plurality of floor panels which are  
mechanically connected to each other

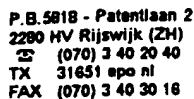
Plancher composé de panneaux de revêtement reliés mécaniquement les  
uns aux autres

In all future communications to the EPO, please quote the application number as indicated above, i.e. including the final four figures (which identify the Directorate responsible for the subsequent procedure). Amendments to a European patent application or European patent must be filed in the language of the proceedings.

REMARK: An issue of the published European patent application will be forwarded to you directly from our printer.

RECEIVING SECTION





## Eingangs- stelle

### Receiving Section

Section de  
Dépôt



DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.6)
A,P	WO 9313280 A1 (JUNCKERS INDUSTRIER A/S), 8 July 1993 (08.07.93) * abstract, details 1,2,3,14 *	1-9	E04F 15/14 E04F 15/02 E04F 13/08
	--		
A	US 3538665 A (P. GOHNER), 10 November 1970 (10.11.70) * details 7,9 *	1-9	
	--		
A	DE 2616077 A1 (HEWENER, H.J.), 27 October 1977 (27.10.77) * figure 1 *	1-9	
	--		
A	FR 1293043 A (ETABILISSEMENTS PIRAUD PLASTIQUES), 2 April 1962 (02.04.62) * figure 2, details 8,9,10 *	1-9	
	-----		
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int. Cl.6)
			E04F A47G
Place of search		Date of completion of the search	Examiner
STOCKHOLM		28 August 1998	NYLUND ÖRJAN
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone			
Y : particularly relevant if combined with another document of the same category			
A : technological background			
O : non-written disclosure			
P : intermediate document			
I : theory or principle underlying the invention			
E : earlier patent document, but published on, or after the filing date			
D : document cited in the application			
L : document cited for other reasons			
.....			
A : member of the same patent family, corresponding document			

# **ANNEX TO THE EUROPEAN SEARCH REPORT** **ON EUROPEAN PATENT APPLICATION NO. EP 98 20 1555.4**

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.  
The members are as contained in the European Patent Office EDP file on 27/07/98  
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent document cited in search report			Publication date	Patent family member(s)		Publication date
WO	9313280	A1	08/07/93	CA	2125876 A	08/07/93
				EP	0624221 A	17/11/94
				JP	7502580 T	16/03/95
-----						
US	3538665	A	10/11/70	NONE		
-----						
DE	2616077	A1	27/10/77	NONE		
-----						
FR	1293043	A	02/04/62	NONE		
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P.B. 5818 - Patentlaan 2  
2280 HV Rijswijk (ZH)  
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TX 31651 epo nl  
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Europäisches  
Patentamt

Eingangs-  
stelle

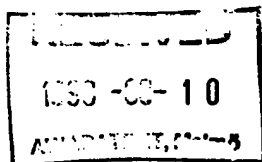
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European  
Patent Office

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Section

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des brevets

Section de  
Dépôt

Giver, Sören Bo  
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P.O. Box 5117  
200 71 Malmö  
SUEDE



Datum/Date

07.08.98

7. Anm./Ref./Réf. 2981378	Anmeldung Nr./Application No./Demande n°/Patent Nr./Patent No./Brevet n°. 98201555.4-2303/
Anmelder/Applicant/Demandeur/Patentinhaber/Proprietor/Titulaire Välinge Aluminium AB	

**MITTEILUNG GEMÄSS TEIL A-III, 5.3 DER RICHTLINIEN FÜR DIE PRÜFUNG IM EPA**

Die dem nachstehend angegebenen Erfinder gemäß Regel 17(3) EPÜ übersandte Mitteilung kam unzustellbar zurück. Bitte teilen Sie uns die richtige Adresse des Erfinders mit (Regel 17(1) EPÜ).

\*\*\*

**NOTIFICATION PURSUANT TO PART A-III, 5.3 OF THE GUIDELINES FOR EXAMINATION IN THE EPO**

The communication issued pursuant to Rule 17(3) EPC, sent to the inventor designated below, has been returned by the postal services. You are requested to indicate the correct address of the inventor (Rule 17(1)).

\*\*\*

**NOTIFICATION FAITE EN APPLICATION DE LA PARTIE A-III, 5.3 DES DIRECTIVES RELATIVES A L'EXAMEN PRATIQUE A L'OEB**

La communication selon la règle 17(3) CBE, transmise à l'inventeur désigné ci-après, a été retournée par les services postaux. Vous êtes prié d'indiquer l'adresse exacte de l'inventeur (règle 17(1) CBE).

ERFINDER : Pervan, Tony  
INVENTOR : Radjursstigen 32  
INVENTEUR : SE / 170 72 Solna

EINGANGSSTELLE  
RECEIVING SECTION  
SECTION DE DEPOT

G. J. W. J.  
The Hague  
09/08/98 13:55:54







# Antrag auf Erteilung eines europäischen Patents / Request for grant of a European patent / Requête en délivrance d'un brevet européen

1

Bestätigung einer bereits durch Telekopie (Telefax) eingereichten Anmeldung / Confirmation of an application already  
filed by facsimile / Confirmation d'une demande déjà déposée par télécopie  
Wenn ja, Datum der Übermittlung der Telekopie und Name der Einreichungsbehörde / If yes, facsimile date and name  
of the authority with which the documents were filed / Si oui, date d'envoi de la télécopie et nom de l'autorité de dépôt

☒ Ja / Yes / OuiDatum / Date  
980512Behörde / Authority / Autorité  
EPO

Nur für amtlichen Gebrauch / For official use only / Cadre réservé à l'administration

Anmeldenummer / Application No. / N° de la demande	MKEY	1
Tag des Eingangs (Regel 24(2)) / Date of receipt (Rule 24(2)) / Date de réception (règle 24(2))	DREC	2
Tag des Eingangs beim EPA (Regel 24(4)) / Date of receipt at EPO (Rule 24(4)) / Date de réception à l'OEB (règle 24(4))	RENA	3
Anmeldetag / Date of filing / Date de dépôt		4

Tabulatoren-Positionen / Tabulation marks / Arrêts de tabulation

Es wird die Erteilung eines europäischen Patents  
und gemäß Artikel 94 die Prüfung der Anmeldung  
beantragt / Grant of a European patent, and  
examination of the application under Article 94,  
are hereby requested / Il est demandé la délivrance  
d'un brevet européen et, conformément à l'article 94,  
l'examen de la demande

EXAM 4

5

Prüfungsantrag in einer zugelassenen Nichtamtssprache  
(siehe Merkblatt II, 5): / Request for examination in an  
admissible non-EPO language (see Notes II, 5): / Requête en  
examen dans une langue non officielle autorisée (voir notice II, 5):

Härmed begärs patenterbarhets-  
prövning enligt Art. 94 EPC

Zeichen des Anmelders oder Vertreters  
(max. 15 Positionen) / Applicant's or representative's  
reference (maximum 15 spaces) / Référence du demandeur  
ou du mandataire (max. 15 caractères ou espaces)

AREF

6

2981378

ANMELDER / APPLICANT / DEMANDEUR  
Name / Nom

Anschrift / Address / Adresse

APPR 01 #

# DEST #

7

VÄLINGE ALUMINIUM AB

8

Kyrkogränd 1  
S-260 40 VIKEN  
Sweden

Zustellanschrift / Address for correspondence /  
Adresse pour la correspondance

PADR

9

Staat des Wohnsitzes oder Sitzes / State of residence or of principal  
place of business / Etat du domicile ou du siège

10

Sweden

Staatsangehörigkeit / Nationality / Nationalité

11

Sweden

Telefon / Telephone / Téléphone

12

Telex / Télex

Telefax / Fax / Téléfax

13

Weitere(r) Anmelder auf Zusatzblatt / Additional applicant(s) on  
additional sheet / Autre(s) demandeur(s) sur feuille additionnelle

14

VERTRETER / REPRESENTATIVE / MANDATAIRE:  
Name / Nom

(Nur einen Vertreter angeben, der in das europäische Patentregister eingetragen und an  
den zugestellt wird / Name only one representative, who is to be listed in the Register of  
European Patents and to whom notification is to be made / N'indiquer qu'un seul manda-  
taire, qui sera inscrit au Registre européen des brevets et auquel signification sera faite)

FREP 01

#

#

15

GIVER, Sören

Geschäftsanschrift / Address of place of business /  
Adresse professionnelle

16

AWAPATENT AB  
Box 5117  
S-200 71 MALMÖ  
Sweden

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17

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Telex / Télex

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18

32407

+46 40 26 05 16

Weitere(r) Vertreter auf Zusatzblatt / Additional representative(s) on  
additional sheet / Autre(s) mandataire(s) sur feuille additionnelle

19

<p><b>Vollmacht / Authorisation / Pouvoir:</b> Ist beigelegt / Is enclosed / ci-joint</p> <p>Ist registriert unter Nummer / has been registered under No. / a été enregistré sous le n°</p> <p style="text-align: right;"><b>GENA</b></p> <p><b>ERFINDER / INVENTOR / INVENTEUR:</b></p> <p>Anmelder ist (sind) alleinige(r) Erfinder / The applicant(s) is (are) the sole inventor(s) / Le(s) demandeur(s) est (sont) le (les) seul(s) inventeur(s)</p> <p>Erfindernennung auf gesondertem Schriftstück / Designation of inventor attached / Voir la désignation de l'inventeur ci-jointe</p> <p><b>BEZEICHNUNG DER ERFINDUNG / TITLE OF INVENTION / TITRE DE L'INVENTION:</b></p> <div style="border: 1px solid black; padding: 5px; text-align: center;"> TIDE      TIEN      TIFR </div> <p><b>PRIORITÄTSERKLÄRUNG / DECLARATION OF PRIORITY / DECLARATION DE PRIORITE</b></p> <p>01 # . . . # . . . . .</p> <p>02 # . . . # . . . . .</p> <p>03 # . . . # . . . . .</p> <p>04 # . . . # . . . . .</p> <p>Weitere Prioritätserklärung(en) auf Zusatzblatt / Additional declaration(s) of priority on additional sheet / Autre(s) déclaration(s) de priorité sur feuille additionnelle</p> <p><b>BIOLOGISCHES MATERIAL      BIOLOGICAL MATERIAL</b></p> <p>Die Erfindung betrifft biologisches Material oder seine Verwendung, das nach Regel 28 hinterlegt worden ist.      The invention relates to and/or uses biological material deposited under Rule 28.</p> <div style="border: 1px solid black; padding: 2px; text-align: center;"> BIOM 1   #                           # </div> <p>Die Angaben nach Regel 28(1) c) sind in den technischen Anmeldeunterlagen enthalten auf / The particulars referred to in Rule 28(1) c) are given in the technical documents in the application on / Les indications visées à la règle 28(1) c) figurent dans les pièces techniques de la demande à la /aux</p> <p>werden später mitgeteilt / will be submitted later / seront communiquées ultérieurement</p> <p>Die Empfangsbescheinigung(en) der Hinterlegungsstelle ist (sind) beigelegt / The receipt(s) of deposit issued by the depositary institution is (are) enclosed / Le(s) récépissé(s) de dépôt délivré(s) par l'autorité de dépôt est (sont) ci-joint(s)</p> <p>wird (werden) nachgereicht / will be filed later / sera (seront) produit(s) ultérieurement</p> <p>Verzicht auf die Verpflichtung des Antragstellers nach Regel 28(3) auf gesondertem Schriftstück / Waiver of the right to an undertaking from the requester pursuant to Rule 28(3) attached / Renonciation, sur document distinct, à l'engagement du requérant au titre de la règle 28(3)</p>	<div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> <div style="float: right;">Nummer Number Numéro</div> </div> <p><b>FLOORING SYSTEM</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 30%;">Staat / State / Etat</th> <th style="width: 30%;">Anmeldetag / Filing date / Date de dépôt</th> <th style="width: 40%;">Aktenzeichen / Application No. / N° de la demande</th> </tr> <tr> <td>1 Sweden</td> <td>93-05-10</td> <td>9301595-6</td> </tr> <tr><td>2</td><td></td><td></td></tr> <tr><td>3</td><td></td><td></td></tr> <tr><td>4</td><td></td><td></td></tr> </table> <p><b>MATIERE BIOLOGIQUE</b></p> <p>L'invention concerne et/ou utilise la matière biologique, déposée conformément à la règle 28.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 50%;">Seite(n) / page(s)</th> <th style="width: 50%;">Zeile(n) / line(s) / ligne(s)</th> </tr> <tr><td>27</td><td></td></tr> <tr><td>27a</td><td></td></tr> <tr><td>28</td><td></td></tr> <tr><td>28a</td><td></td></tr> <tr><td>29</td><td></td></tr> </table>	Staat / State / Etat	Anmeldetag / Filing date / Date de dépôt	Aktenzeichen / Application No. / N° de la demande	1 Sweden	93-05-10	9301595-6	2			3			4			Seite(n) / page(s)	Zeile(n) / line(s) / ligne(s)	27		27a		28		28a		29	
Staat / State / Etat	Anmeldetag / Filing date / Date de dépôt	Aktenzeichen / Application No. / N° de la demande																										
1 Sweden	93-05-10	9301595-6																										
2																												
3																												
4																												
Seite(n) / page(s)	Zeile(n) / line(s) / ligne(s)																											
27																												
27a																												
28																												
28a																												
29																												

Falls das biologische Material nicht vom Anmelder, sondern von einem Dritten hinterlegt wurde: / Where the biological material has been deposited by a person other than the applicant: / Lorsque la matière biologique a été déposée par une personne autre que le demandeur:

Ermächtigung nach Regel 28(1)d) / Authorisation under Rule 28(1)d) / Autorisation en vertu de la règle 28(1)d)

Ist beigelegt / Is enclosed / ci-jointe

wird nachgereicht / will be filed later / sera produite ultérieurement

**NUCLEOTID-UND AMINOSÄURESEQUENZEN / NUCLEOTIDE AND AMINO ACID SEQUENCES / SEQUENCES DE NUCLEOTIDES ET D'ACIDES AMINES**

SEQ (1) 31

Die Beschreibung enthält ein Sequenzprotokoll nach Regel 27a(1) / The description contains a sequence listing in accordance with Rule 27a(1) / La description contient une liste de séquences selon la règle 27bis(1)

Der vorgeschriebene maschinenlesbare Datenträger ist beigelegt / The prescribed machine readable data carrier is enclosed / Le support de données prescrit déchiffirable par machine est annexé

Es wird hiermit erklärt, daß die auf dem Datenträger gespeicherte Information mit dem schriftlichen Sequenzprotokoll übereinstimmt (Regel 27a(2)) / It is hereby stated that the information recorded on the data carrier is identical to the written sequence listing (Rule 27a(2)) / Il est déclaré par la présente que l'information figurant sur le support de données est identique à celle que contient la liste de séquences écrite (règle 27bis (2))

**BENENNUNG DER VERTRAGSSTAATEN UND ERKLÄRUNGEN HIERZU**

**DESIGNATION OF THE CONTRACTING STATES AND ASSOCIATED DECLARATIONS**

1. Hiermit werden sämtliche Vertragsstaaten des EPU benannt, die bei Einreichung dieser Anmeldung dem EPU angehören.

1. All States which are Contracting States to the EPC at the filing of this application are hereby designated.

2. Der Anmelder beabsichtigt derzeit, Benennungsgebühren für die nachfolgend angekreuzten Vertragsstaaten zu entrichten:

2. The applicant currently intends to pay designation fees for the States marked below with a cross:

DEST

- ☒ AT Österreich / Austria / Autriche
- ☒ BE Belgien / Belgium / Belgique
- ☒ CH/LI Schweiz und Liechtenstein / Switzerland and Liechtenstein / Suisse et Liechtenstein
- ☒ DE Deutschland / Germany / Allemagne
- ☒ DK Dänemark / Denmark / Danemark
- ☒ ES Spanien / Spain / Espagne
- ☐ FI Finnland / Finland / Finlande
- ☒ FR Frankreich / France / France
- ☐ —
- ☐ —

(Platz für Vertragsstaaten, für die das EPU nach Drucklegung dieses Formblatts in Kraft tritt / Space for Contracting States for which the EPC enters into force after this form has been printed / Prévu pour des Etats contractants à l'égard desquels le CBE entrera en vigueur après l'impression du présent formulaire)

Es wird beantrag, für die unter Nr. 2 nicht angekreuzten Vertragsstaaten von der Zustellung von Mitteilungen nach Regel 85a (1) und Regel 69 (1) abzusehen. Ist ein automatischer Abbuchungsauftrag erteilt worden (Feld 43), so wird beantrag, bei Ablauf der Grundfrist nach Artikel 79 (2) Benennungsgebühren nur für die unter Nr. 2 angekreuzten Vertragsstaaten abzubuchen.

It is requested that no communications under Rule 85a(1) and Rule 69(1) be notified concerning the Contracting States not marked with a cross under No. 2. If an automatic debit order has been given (section 43), it is requested that, when the basic period specified in Art. 79(2) expires, designation fees be debited only for the Contracting States marked with a cross under No. 2.

Name und Anschrift des Hinterlegers / Name and address of depositor / Nom et adresse du déposant :

30a

30b

32

**DESIGNATION D'ETATS CONTRACTANTS ET DECLARATIONS A CE PROPOS**

☒ 1. Sont désignés tous les Etats qui sont des Etats contractants de la CBE à la date du dépôt de la présente demande.

2. Le demandeur se propose actuellement de payer des taxes de désignation pour les Etats cochés ci-dessous :

- ☒ GB Vereinigtes Königreich / United Kingdom / Royaume-Uni
- ☒ GR Griechenland / Greece / Grèce
- ☒ IE Irland / Ireland / Irlande
- ☒ IT Italien / Italy / Italie
- ☒ LU Luxemburg / Luxembourg / Luxembourg
- ☒ MC Monaco / Monaco / Monaco
- ☒ NL Niederlande / Netherlands / Pays-Bas
- ☒ PT Portugal / Portugal / Portugal
- ☒ SE Schweden / Sweden / Suède
- ☐ —
- ☐ —

(Platz für Vertragsstaaten, für die das EPU nach Drucklegung dieses Formblatts in Kraft tritt / Space for Contracting States for which the EPC enters into force after this form has been printed / Prévu pour des Etats contractants à l'égard desquels le CBE entrera en vigueur après l'impression du présent formulaire)

☒ Prière de ne pas procéder à la signification des notifications prévues par les règles 85bis(1) et 69(1) pour les Etats contractants n'ayant pas été cochés au n° 2. Si un ordre de prélèvement automatique a été donné (rubrique 43), prière de ne prélever à l'expiration des délais de base tels que définis à l'article 79(2) que les taxes de désignation pour les Etats contractants cochés au n° 2.

<b>Verschiedene Anmelder für verschiedene Vertragsstaaten /</b> <b>Different applicants for different Contracting States /</b> <b>Différents demandeurs pour différents Etats contractants</b>	<b>33</b> Name(n) des (der) Anmelder(s) und benannte Vertragsstaaten / Name(s) of applicant(s) and designated Contracting States / Nom(s) du (des) demandeur(s) et des Etats contractants désignés																
APPR 02 # <span style="border: 1px solid black; display: inline-block; width: 100px; height: 1.2em; vertical-align: middle;"></span>																	
<div style="display: flex; justify-content: space-between;"> <div style="width: 48%;"> <b>ERSTRECKUNG DES EUROPÄISCHEN PATENTS</b>             Diese Anmeldung gilt als Antrag, die europäische Patentanmeldung und das darauf erteilte europäische Patent auf alle Nicht-Vertragsstaaten des EPU zu erstrecken, mit denen am Tag ihrer Einreichung „Erstreckungsabkommen“ bestehen (Derzeit: Albanien, Litauen, Lettland, Rumänien, Slowenien). Die Erstreckung wird jedoch nur wirksam, wenn die vorgeschriebene Erstreckungsgebühr entrichtet wird.         </div> <div style="width: 48%;"> <b>EXTENSION OF THE EUROPEAN PATENT</b>             This application is deemed to be a request to extend the European patent application and the European patent granted in respect of it to all non-Contracting States to the EPC with which "extension agreements" exist on the date on which the application is filed (Present situation: Albania, Lithuania, Latvia, Romania, Slovenia). However, the extension only takes effect if the prescribed extension fee is paid.         </div> </div> <div style="text-align: right; margin-top: 10px; border: 1px solid black; padding: 2px; width: fit-content;">EXPT</div> <p>Der Anmelder beabsichtigt derzeit, die Erstreckungsgebühr für die nachfolgend angekreuzten Staaten zu entrichten: / The applicant currently intends to pay the extension fee for the States marked below with a cross: / Le demandeur se propose actuellement d'acquitter la taxe d'extension pour les Etats dont le nom est coché ci-après:</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 80%;">Albanien / Albania / Albanie</td> <td style="width: 20%; text-align: center;">AL</td> </tr> <tr> <td>Litauen / Lithuania / Lituanie</td> <td style="text-align: center;">LT</td> </tr> <tr> <td>Lettland / Latvia / Lettonie</td> <td style="text-align: center;">LV</td> </tr> <tr> <td>Rumänien / Romania / Roumanie</td> <td style="text-align: center;">RO</td> </tr> <tr> <td>Slowenien / Slovenia / Slovénie</td> <td style="text-align: center;">SI</td> </tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </table> <p style="font-size: 0.8em; margin-top: 10px;">(Platz für Staaten, mit denen nach Drucklegung dieses Formblatts „Erstreckungsabkommen“ in Kraft treten) /          (Space for States with which "extension agreements" enter into force after this form has been printed) /          (Prévu pour des Etats à l'égard desquels des «accords d'extension» entreront en vigueur après l'impression du présent formulaire)</p>	Albanien / Albania / Albanie	AL	Litauen / Lithuania / Lituanie	LT	Lettland / Latvia / Lettonie	LV	Rumänien / Romania / Roumanie	RO	Slowenien / Slovenia / Slovénie	SI							<b>34</b> <b>EXTENSION DES EFFETS DU BREVET EUROPEEN</b>  La présente demande est réputée constituer une requête en extension des effets de la demande de brevet européen et du brevet européen délivré sur la base de cette demande à tous les Etats non parties à la CBE avec lesquels il existe un «accord d'extension» à la date du dépôt de la demande (Situation actuelle : Albanie, Lituanie, Lettonie, Roumanie, Slovénie). Toutefois l'extension ne produit ses effets que s'il est acquitté la taxe d'extension prescrite.
Albanien / Albania / Albanie	AL																
Litauen / Lithuania / Lituanie	LT																
Lettland / Latvia / Lettonie	LV																
Rumänien / Romania / Roumanie	RO																
Slowenien / Slovenia / Slovénie	SI																
<b>Die Anmeldung ist eine Teilanmeldung /</b> <b>The application is a divisional application /</b> <b>La présente demande constitue une demande divisionnaire</b>	<b>35</b> <input checked="" type="checkbox"/> <span style="border: 1px solid black; padding: 2px 10px;">94915725.9</span> Nummer der früheren Anmeldung No. of earlier application Numéro de la demande initiale																
<b>Es handelt sich um eine Anmeldung nach Art. 61(1)(b) /</b> <b>The application is an Art. 61(1)(b) application /</b> <b>La présente demande constitue une demande selon l'article 61(1)(b)</b>	<b>36</b> <span style="border: 1px solid black; display: inline-block; width: 150px; height: 1.2em; vertical-align: middle;"></span> Nummer der früheren Anmeldung No. of earlier application Numéro de la demande initiale																
<b>Patentansprüche / Claims / Revendications</b>	<b>37</b> <span style="border: 1px solid black; padding: 2px 10px;">9</span> Zahl der Patentansprüche Number of claims Nombre de revendications																
<b>Zur Veröffentlichung mit der Zusammenfassung wird vorgeschlagen</b> <b>Abbildung Nr. / With the abstract it is proposed to publish</b> <b>figure No. / Il est proposé de publier avec l'abrégé</b> <b>la figure n°</b>	<b>39</b> <span style="border: 1px solid black; padding: 2px 10px;">3a-3c</span> Nummer / Number / Numéro																
<div style="text-align: right; border: 1px solid black; padding: 2px; width: fit-content;">DRAW (2)</div>																	

Zusätzliche Abschrift(en) der im europäischen Recherchenbericht angeführten Schriftstücke wird (werden) beantragt / Additional copy(ies) of the documents cited in the European search report is (are) requested / Prière de fournir une (des) copie(s) supplémentaire(s) des documents cités dans le rapport de recherche européenne

ASOC

40

1

Anzahl der zusätzlichen Sätze von Abschriften  
Number of additional sets of copies  
Nombre de jeux supplémentaires de copies

Es wird die Rückerstattung der Recherhengebühr gemäß Art. 10 GebO beantragt / Refund of the search fee is requested pursuant to Article 10 of the Rules relating to Fees / Le remboursement de la taxe de recherche est demandé en vertu de l'article 10 du règlement relatif aux taxes

41

Eine Kopie des Recherchenberichts ist beigelegt / A copy of the search report is attached / Une copie du rapport de recherche est jointe

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**AUTOMATISCHER ABBUCHUNGSauftrag** (nur möglich für Inhaber von beim EPA geführten laufenden Konten)  
**AUTOMATIC DEBIT ORDER** (for EPO deposit account holders only)  
**ORDRE DE PRELEVEMENT AUTOMATIQUE** (uniquement possible pour les titulaires de comptes courants ouverts auprès de l'OEB)

Das Europäische Patentamt wird hiermit beauftragt, fällig werdende Gebühren und Auslagen nach Maßgabe der Vorschriften über das automatische Abbuchungsverfahren vom nebenstehenden laufenden Konto abzubuchen / The European Patent Office is hereby authorised, under the Arrangements for the automatic debiting procedure, to debit from the deposit account opposite any fees and costs falling due / Par la présente, il est demandé à l'Office européen des brevets de prélever du compte courant ci-contre les taxes et frais venant à échéance, conformément à la réglementation relative au prélèvement automatique

DECA

43

**FÜR AUTOMATISCHEN ABBUCHUNGSauftrag:**  
**FOR AUTOMATIC DEBIT ORDER:**  
**POUR L'ORDRE DE PRELEVEMENT AUTOMATIQUE:**

Nummer des laufenden Kontos /  
Deposit account number /  
Numéro du compte courant

Name des Kontoinhabers /  
Account holder's name /  
Nom du titulaire du compte

Eventuelle RÜCKZAHLUNGEN auf das nebenstehende beim EPA geführte laufende Konto / REIMBURSEMENT, if any, to EPO deposit account opposite / REMBOURSEMENTS éventuels à effectuer sur le compte courant ci-contre ouvert auprès de l'OEB

DEPA

44

Nummer des laufenden Kontos /  
Deposit account number /  
Numéro du compte courant

Name des Kontoinhabers /  
Account holder's name /  
Nom du titulaire du compte

2810.0022

AWAPATENT AB

Die vorgeschriebene Liste über die diesem Antrag beigelegten Unterlagen ergibt sich aus der vorbereiteten Empfangsbescheinigung (Seite 6 dieses Antrages)

The prescribed list of documents enclosed with this request is shown on the prepared receipt (page 6 of this request)

45

La liste prescrite des documents joints à cette requête figure sur le récépissé préalable (page 6 de la présente requête)

Unterschrift(en) des (der) Anmelders(s) oder Vertreter(s) /  
Signature(s) of applicant(s) or representative(s) /  
Signature(s) du (des) demandeur(s) ou du (des) mandataire(s).

46

Für Angestellte nach Artikel 133(3) Satz 1 mit allgemeiner Vollmacht / For employees under Article 133(3), 1st sentence, having a general authorisation / Pour les employés mentionnés à l'article 133(3), 1<sup>ère</sup> phrase, munis d'un pouvoir général  
Nr. / No. / n°:

Ort / Place / Lieu MALMÖ

Datum / Date 1998-05-12

  
Sören Giver  
Authorised Representative

Name des (der) Unterzeichneten bitte mit Schreibmaschine wiederholen. Bei juristischen Personen bitte die Stellung des (der) Unterzeichneten innerhalb der Gesellschaft mit Schreibmaschine angeben. / Please type name under signature. In case of legal persons, the position of the signatory within the company should also be typed. / Le ou les noms des signataires doivent être également dactylographiés. S'il s'agit d'une personne morale, la position occupée au sein de celle-ci par le ou les signataires sera indiquée à la machine à écrire.

# Empfangsbescheinigung / Receipt for documents / Récépissé de documents 6

(Liste der diesem Antrag beigelegten Unterlagen)

(Checklist of enclosed documents)

(Liste des documents annexés à la présente requête)

Es wird hiermit der Empfang der unten bezeichneten Dokumente bescheinigt / Receipt of the documents indicated below is hereby acknowledged / Nous attestons le dépôt des documents désignés ci-dessous

Wird im Falle der Einreichung der europäischen Patentanmeldung bei einer nationalen Behörde diese Empfangsbescheinigung vom Europäischen Patentamt übersandt, so ist sie als Mitteilung gemäß Regel 24(4) anzusehen (siehe Feld RENA). Nach Erhalt der Mitteilung nach Regel 24(4) sind alle weiteren Unterlagen, die die Anmeldung betreffen, nur noch unmittelbar beim EPA einzureichen. / If this receipt is issued by the European Patent Office and the European patent application was filed with a national authority it serves as a communication under Rule 24(4) (see Section RENA). Once the communication under Rule 24(4) has been received, all further documents relating to the application must be sent directly to the European Patent Office. / Si, en cas de dépôt de la demande de brevet européen auprès d'un service national, l'Office européen des brevets délivre le présent récépissé de documents, ce récépissé est réputé être la notification visée à la règle 24(4). Dès que la notification visée à la règle 24(4) a été reçue, tous les autres documents relatifs à la demande doivent être adressés directement à l'OEB.

AWAPATENT AB  
Box 5117  
S-200 71 MALMÖ  
Sweden

Nur für amtlichen Gebrauch / For official use only / Cadre réservé à l'administration

Datum / Date

Unterschrift / Amtsstempel / Signature / Official stamp / Signature / Cachet officiel

Anmeldenummer / Application No. / N° de la demande			
Tag des Eingangs (Regel 24(2)) / Date of receipt (Rule 24(2)) / Date de réception (règle 24(2))	DREC		
Zeichen des Anmelders/Vertreters / Applicant's/ Representative's ref. / Référence du demandeur ou du mandataire	AREF		
Nur nach Einreichung der Anmeldung bei einer nationalen Behörde: / Only after filing of the application with a national authority: / Seulement après le dépôt de la demande auprès d'un service national:			
Tag des Eingangs beim EPA (Regel 24(4)) / Date of receipt at EPO (Rule 24(4)) / Date de réception à l'OEB (règle 24(4))	RENA		
<b>A. Anmeldeunterlagen und Prioritätsbeleg(e) / Application documents and priority document(s) / Pièces de la demande et document(s) de priorité</b>		47	
1. Beschreibung / Description		Stückzahl / Number of copies / Nombre d'exemplaire	Blattzahl* eines Stücks / Number of sheets* in each copy / Nombre de feuilles* par exemplaire
2. Patentansprüche / Claim(s) / Revendication(s)		3	19
3. Zeichnung(en) / Drawing(s) / Dessin(s)	DRAW.1 #	3	4
4. Zusammenfassung / Abstract / Abrégé		3	6
5. Übersetzung der Anmeldeunterlagen / Translation of the application documents / Traduction des pièces de la demande		3	1
6. Prioritätsbeleg(e) / Priority document(s) / Document(s) de priorité			
7. Übersetzung des (der) Prioritätsbelegs/belegs / Translation of priority document(s) / Traduction du (des) document(s) de priorité			
<b>B. Der Anmeldung in der eingereichten Fassung liegen folgende Unterlagen bei: / This application as filed is accompanied by the items below: / A la présente demande sont annexées les pièces suivantes:</b>		48	
1. Einzelvollmacht / Specific authorisation / Pouvoir particulier		<input checked="" type="checkbox"/>	Copy of authorisation filed in the parent application.
2. Allgemeine Vollmacht / General authorisation / Pouvoir général		<input type="checkbox"/>	
3. Erfindernennung / Designation of inventor / Désignation de l'inventeur		<input checked="" type="checkbox"/>	
4. Früherer Recherchenbericht / Earlier search report / Rapport de recherche antérieure		<input type="checkbox"/>	
5. Gebührenzahlungsvordruck (EPA Form 1010) / Voucher for the settlement of fees (EPO Form 1010) / Bordereau de règlement de taxes (OEB Form 1010)		<input type="checkbox"/>	
6. Scheck (ausgeschlossen bei Einreichung bei den nationalen Behörden) / Cheque (not when filing with national authorities) / Chèque (pas de chèque en cas de dépôt auprès des services nationaux)		<input type="checkbox"/>	
7. Datenträger für Sequenzprotokoll / Data carrier for sequence listing / Support de données pour liste de séquences	SEQ. (4)	<input type="checkbox"/>	
8. Zusatzblatt / Additional sheet / Feuille additionnelle		<input type="checkbox"/>	
9. Sonstige Unterlagen (bitte hier spezifizieren) / Other (please specify here) / Autres documents (veuillez préciser ici)		<input checked="" type="checkbox"/>	Debit Order
<b>C. Kopien dieser Empfangsbescheinigung / Copies of this receipt for documents / Copies du présent récépissé de documents</b>		49	
		2	Anzahl der Kopien / Number of copies / Nombre de copies

\* Die Richtigkeit der Angabe der Blattzahl und der Gesamtzahl der Abbildungen wurde bei Eingang nicht geprüft / No check was made on receipt that the number of sheets and the total number of figures indicated were correct / L'exactitude du nombre de feuilles et du nombre total de figures n'a pas été contrôlée lors du dépôt

## FLOORING SYSTEM

### Technical Field

The invention generally relates to a system for providing a joint along adjacent joint edges of two building panels, especially floor panels.

5       More specifically, the joint is of the type where the adjacent joint edges together form a first mechanical connection locking the joint edges to each other in a first direction at right angles to the principal plane of the panels, and where a locking device forms a second  
10       mechanical connection locking the panels to each other in a second direction parallel to the principal plane and at right angles to the joint edges, the locking device comprising a locking groove which extends parallel to and spaced from the joint edge of one of the panels, and said  
15       locking groove being open at the rear side of this one panel.

The invention is especially well suited for use in joining floor panels, especially thin laminated floors. Thus, the following description of the prior art and of  
20       the objects and features of the invention will be focused on this field of use. It should however be emphasised that the invention is useful also for joining ordinary wooden floors as well as other types of building panels, such as wall panels and roof slabs.

### 25       Background of the Invention

A joint of the aforementioned type is known e.g. from SE 450,141. The first mechanical connection is achieved by means of joint edges having tongues and grooves. The locking device for the second mechanical  
30       connection comprises two oblique locking grooves, one in the rear side of each panel, and a plurality of spaced-apart spring clips which are distributed along the joint



and the legs of which are pressed into the grooves, and which are biased so as to tightly clamp the floor panels together. Such a joining technique is especially useful for joining thick floor panels to form surfaces of a considerable expanse.

Thin floor panels of a thickness of about 7-10 mm, especially laminated floors, have in a short time taken a substantial share of the market. All thin floor panels employed are laid as "floating floors" without being attached to the supporting structure. As a rule, the dimension of the floor panels is 200 x 1200 mm, and their long and short sides are formed with tongues and grooves. Traditionally, the floor is assembled by applying glue in the groove and forcing the floor panels together. The tongue is then glued in the groove of the other panel. As a rule, a laminated floor consists of an upper decorative wear layer of laminate having a thickness of about 1 mm, an intermediate core of particle board or other board, and a base layer to balance the construction. The core has essentially poorer properties than the laminate, e.g. in respect of hardness and water resistance, but it is nonetheless needed primarily for providing a groove and tongue for assemblage. This means that the overall thickness must be at least about 7 mm. These known laminated floors using glued tongue-and-groove joints however suffer from several inconveniences.

First, the requirement of an overall thickness of at least about 7 mm entails an undesirable restraint in connection with the laying of the floor, since it is easier to cope with low thresholds when using thin floor panels, and doors must often be adjusted in height to come clear of the floor laid. Moreover, manufacturing costs are directly linked with the consumption of material.

Second, the core must be made of moisture-absorbent material to permit using water-based glues when laying the floor. Therefore, it is not possible to make the floors thinner using so-called compact laminate, because

of the absence of suitable gluing methods for such non-moisture-absorbent core materials.

Third, since the laminate layer of the laminated floors is highly wear-resistant, tool wear is a major  
5 problem when working the surface in connection with the formation of the tongue.

Fourth, the strength of the joint, based on a glued tongue-and-groove connection, is restricted by the properties of the core and of the glue as well as by the  
10 depth and height of the groove. The laying quality is entirely dependent on the gluing. In the event of poor gluing, the joint will open as a result of the tensile stresses which occur e.g. in connection with a change in air humidity.

15 Fifth, laying a floor with glued tongue-and-groove joints is time-consuming, in that glue must be applied to every panel on both the long and short sides thereof.

Sixth, it is not possible to disassemble a glued floor once laid, without having to break up the joints.  
20 Floor panels that have been taken up cannot therefore be used again. This is a drawback particularly in rental houses where the flat concerned must be put back into the initial state of occupancy. Nor can damaged or worn-out panels be replaced without extensive efforts, which would  
25 be particularly desirable on public premises and other areas where parts of the floor are subjected to great wear.

Seventh, known laminated floors are not suited for such use as involves a considerable risk of moisture  
30 penetrating down into the moisture-sensitive core.

Eighth, present-day hard, floating floors require, prior to laying the floor panels on hard subfloors, the laying of a separate underlay of floor board, felt, foam or the like, which is to damp impact sounds and to make  
35 the floor more pleasant to walk on. The placement of the underlay is a complicated operation, since the underlay

must be placed in edge-to-edge fashion. Different underlays affect the properties of the floor.

There is thus a strongly-felt need to overcome the above-mentioned drawbacks of the prior art. It is however  
5 not possible simply to use the known joining technique with glued tongues and grooves for very thin floors, e.g. with floor thicknesses of about 3 mm, since a joint based on a tongue-and-groove connection would not be sufficiently strong and practically impossible to produce for  
10 such thin floors. Nor are any other known joining techniques usable for such thin floors. Another reason why the making of thin floors from e.g. compact laminate involves problems is the thickness tolerances of the panels, being about 0.2-0.3 mm for a panel thickness of  
15 about 3 mm. A 3-mm compact laminate panel having such a thickness tolerance would have, if ground to uniform thickness on its rear side, an unsymmetrical design, entailing the risk of bulging. Moreover, if the panels have different thicknesses, this also means that the joint  
20 will be subjected to excessive load.

Nor is it possible to overcome the above-mentioned problems by using double-adhesive tape or the like on the undersides of the panels, since such a connection catches directly and does not allow for subsequent  
25 adjustment of the panels as is the case with ordinary gluing.

Using U-shaped clips of the type disclosed in the above-mentioned SE 450,141, or similar techniques, to overcome the drawbacks discussed above is no viable alternative either. Especially, biased clips of this type  
30 cannot be used for joining panels of such a small thickness as 3 mm. Normally, it is not possible to disassemble the floor panels without having access to their undersides. This known technology relying on clips suffers  
35 from the additional drawbacks:

- Subsequent adjustment of the panels in their longitudinal direction is a complicated operation in con-

nection with laying, since the clips urge the panels tightly against each other.

- Floor laying using clips is time-consuming.
- This technique is usable only in those cases where  
5 the floor panels are resting on underlying joists with the clips placed therebetween. For thin floors to be laid on a continuous, flat supporting structure, such clips cannot be used.
- The floor panels can be joined together only at  
10 their long sides. No clip connection is provided on the short sides.

#### Technical Problems and Objects of the Invention

A main object of the invention therefore is to provide a system for joining together building panels, especially floor panels for hard, floating floors, which allows using floor panels of a smaller overall thickness  
15 than present-day floor panels.

A particular object of the invention is to provide a panel-joining system which

- 20 - makes it possible in a simple, cheap and rational way to provide a joint between floor panels without requiring the use of glue, especially a joint based primarily only on mechanical connections between the panels;
- 25 - can be used for joining floor panels which have a smaller thickness than present-day laminated floors and which have, because of the use of a different core material, superior properties than present-day floors even at a thickness of 3 mm;
- 30 - makes it possible between thin floor panels to provide a joint that eliminates any unevennesses in the joint because of thickness tolerances of the panels;
- allows joining all the edges of the panels;
- reduces tool wear when manufacturing floor panels  
35 with hard surface layers;

- allows repeated disassembly and reassembly of a floor previously laid, without causing damage to the panels, while ensuring high laying quality;
- makes it possible to provide moisture-proof floors;
- 5 - makes it possible to obviate the need of accurate, separate placement of an underlay before laying the floor panels; and
- considerably cuts the time for joining the panels.

10 These and other objects of the invention are achieved by means of a panel-joining system having the features recited in the appended claims.

Thus, the invention provides a system for making a joint along adjacent joint edges of two building panels, especially floor panels, in which joint:

15 the adjacent joint edges together form a first mechanical connection locking the joint edges to each other in a first direction at right angles to the principal plane of the panels, and

20 a locking device arranged on the rear side of the panels forms a second mechanical connection locking the panels to each other in a second direction parallel to the principal plane and at right angles to the joint edges, said locking device comprising a locking groove which extends parallel to and spaced from the joint edge  
25 of one of said panels, termed groove panel, and which is open at the rear side of the groove panel, said system being characterised in

that the locking device further comprises a strip integrated with the other of said panels, termed strip  
30 panel, said strip extending throughout substantially the entire length of the joint edge of the strip panel and being provided with a locking element projecting from the strip, such that when the panels are joined together, the strip projects on the rear side of the groove panel with  
35 its locking element received in the locking groove of the groove panel,

that the panels, when joined together, can occupy a relative position in said second direction where a play exists between the locking groove and a locking surface on the locking element that is facing the joint edges and  
5 is operative in said second mechanical connection,

that the first and the second mechanical connection both allow mutual displacement of the panels in the direction of the joint edges, and

that the second mechanical connection is so conceived as to allow the locking element to leave the locking  
10 groove if the groove panel is turned about its joint edge angularly away from the strip.

The term "rear side" as used above should be considered to comprise any side of the panel located behind/  
15 underneath the front side of the panel. The opening plane of the locking groove of the groove panel can thus be located at a distance from the rear surface of the panel resting on the supporting structure. Moreover, the strip, which in the invention extends throughout substantially  
20 the entire length of the joint edge of the strip panel, should be considered to encompass both the case where the strip is a continuous, uninterrupted element, and the case where the "strip" consists in its longitudinal direction of several parts, together covering the main portion  
25 of the joint edge.

It should also be noted (i) that it is the first and the second mechanical connection as such that permit mutual displacement of the panels in the direction of the joint edges, and that (ii) it is the second mechanical  
30 connection as such that permits the locking element to leave the locking groove if the groove panel is turned about its joint edge angularly away from the strip. Within the scope of the invention, there may thus exist means, such as glue and mechanical devices, that can  
35 counteract or prevent such displacement and/or upward angling.

The system according to the invention makes it possible to provide concealed, precise locking of both the short and long sides of the panels in hard, thin floors. The floor panels can be quickly and conveniently dis-  
5 assembled in the reverse order of laying without any risk of damage to the panels, ensuring at the same time a high laying quality. The panels can be assembled and dis-  
assembled much faster than in present-day systems, and any damaged or worn-out panels can be replaced by taking  
10 up and re-laying parts of the floor.

According to an especially preferred embodiment of the invention, a system is provided which permits precise joining of thin floor panels having, for example, a thickness of the order of 3 mm and which at the same time  
15 provides a tolerance-independent smooth top face at the joint. To this end, the strip is mounted in an equalising groove which is countersunk in the rear side of the strip panel and which exhibits an exact, predetermined distance  
20 from its bottom to the front side of the strip panel. The part of the strip projecting behind the groove panel engages a corresponding equalising groove, which is countersunk in the rear side of the groove panel and which exhibits the same exact, predetermined distance  
25 from its bottom to the front side of the groove panel. The thickness of the strip then is at least so great that the rear side of the strip is flush with, and preferably projects slightly below the rear side of the panels. In this embodiment, the panels will always rest, in the joint, with their equalising grooves on a strip. This  
30 levels out the tolerance and imparts the necessary strength to the joint. The strip transmits horizontal and upwardly-directed forces to the panels and downwardly-directed forces to the existing subfloor.

Preferably, the strip may consist of a material  
35 which is flexible, resilient and strong, and can be sawn. A preferred strip material is sheet aluminium. In an alu-

minium strip, sufficient strength can be achieved with a strip thickness of the order of 0.5 mm.

In order to permit taking up previously laid, joined floor panels in a simple way, a preferred embodiment of the invention is characterised in that when the groove panel is pressed against the strip panel in the second direction and is turned angularly away from the strip, the maximum distance between the axis of rotation of the groove panel and the locking surface of the locking groove closest to the joint edges is such that the locking element can leave the locking groove without contacting the locking surface of the locking groove. Such a disassembly can be achieved even if the aforementioned play between the locking groove and the locking surface is not greater than 0.2 mm.

According to the invention, the locking surface of the locking element is able to provide a sufficient locking function even with very small heights of the locking surface. Efficient locking of 3-mm floor panels can be achieved with a locking surface that is as low as 2 mm. Even a 0.5-mm-high locking surface may provide sufficient locking. The term "locking surface" as used herein relates to the part of the locking element engaging the locking groove to form the second mechanical connection.

For optimal function of the invention, the strip and the locking element should be formed on the strip panel with high precision. Especially, the locking surface of the locking element should be located at an exact distance from the joint edge of the strip panel.

Furthermore, the extent of the engagement in the floor panels should be minimised, since it reduces the floor strength.

By known manufacturing methods, it is possible to produce a strip with a locking pin, for example by extruding aluminium or plastics into a suitable section, which is thereafter glued to the floor panel or is inserted in special grooves. These and all other tradi-



tional methods do however not ensure optimum function and an optimum level of economy. To produce the joint system according to the invention, the strip is suitably formed from sheet aluminium, and is mechanically fixed to the strip panel.

The laying of the panels can be performed by first placing the strip panel on the subfloor and then moving the groove panel with its long side up to the long side of the strip panel, at an angle between the principal plane of the groove panel and the subfloor. When the joint edges have been brought into engagement with each other to form the first mechanical connection, the groove panel is angled down so as to accommodate the locking element in the locking groove.

Laying can also be performed by first placing both the strip panel and the groove panel flat on the subfloor and then joining the panels parallel to their principal planes while bending the strip downwards until the locking element snaps up into the locking groove. This laying technique enables in particular mechanical locking of both the short and long sides of the floor panels. For example, the long sides can be joined together by using the first laying technique with downward angling of the groove panel, while the short sides are subsequently joined together by displacing the groove panel in its longitudinal direction until its short side is pressed on and locked to the short side of an adjacent panel in the same row.

In connection with their manufacture, the floor panels can be provided with an underlay of e.g. floor board, foam or felt. The underlay should preferably cover the strip such that the joint between the underlays is offset in relation to the joint between the floor panels.

The above and other features and advantages of the invention will appear from the appended claims and the following description of embodiments of the invention.

The invention will now be described in more detail hereinbelow with reference to the accompanying drawing Figures.

#### Description of Drawing Figures

5 Figs 1a and 1b schematically show in two stages how two floor panels of different thickness are joined together in floating fashion according to a first embodiment of the invention.

10 Figs 2a-c show in three stages a method for mechanically joining two floor panels according to a second embodiment of the invention.

Figs 3a-c show in three stages another method for mechanically joining the floor panels of Figs 2a-c.

15 2a-c as seen from below and from above, respectively.

Fig. 5 illustrates in perspective a method for laying and joining floor panels according to a third embodiment of the invention.

20 Fig. 6 shows in perspective and from below a first variant for mounting a strip on a floor panel.

Fig. 7 shows in section a second variant for mounting a strip on a floor panel.

#### Description of Preferred Embodiments

25 Figs 1a and 1b, to which reference is now made, illustrate a first floor panel 1, hereinafter termed strip panel, and a second floor panel 2, hereinafter termed groove panel. The terms "strip panel" and "groove panel" are merely intended to facilitate the description of the invention, the panels 1, 2 normally being identical in  
30 practice. The panels 1 and 2 may be made from compact laminate and may have a thickness of about 3 mm with a thickness tolerance of about  $\pm 0.2$  mm. Considering this thickness tolerance, the panels 1, 2 are illustrated with different thicknesses (Fig. 1b), the strip panel 1 having

a maximum thickness (3.2 mm) and the groove panel 2 having a minimum thickness (2.8 mm).

To enable mechanical joining of the panels 1, 2 at opposing joint edges, generally designated 3 and 4, respectively, the panels are provided with grooves and strips as described in the following.

Reference is now made primarily to Figs 1a and 1b, and secondly to Figs 4a and 4b showing the basic design of the floor panels from below and from above, respectively.

From the joint edge 3 of the strip panel 1, i.e. the one long side, projects horizontally a flat strip 6 mounted at the factory on the underside of the strip panel 1 and extending throughout the entire joint edge 3. The strip 6, which is made of flexible, resilient sheet aluminium, can be fixed mechanically, by means of glue or in any other suitable way. In Figs 1a and 1b, the strip 6 is glued, while in Figs 4a and 4b it is mounted by means of a mechanical connection, which will be described in more detail hereinbelow.

Other strip materials can be used, such as sheets of other metals, as well as aluminium or plastics sections. Alternatively, the strip 6 may be integrally formed with the strip panel 1. At any rate, the strip 6 should be integrated with the strip panel 1, i.e. it should not be mounted on the strip panel 1 in connection with laying. As a non-restrictive example, the strip 6 may have a width of about 30 mm and a thickness of about 0.5 mm.

As appears from Figs 4a and 4b, a similar, although shorter strip 6' is provided also at one short side 3' of the strip panel 1. The shorter strip 6' does however not extend throughout the entire short side 3' but is otherwise identical with the strip 6 and, therefore, is not described in more detail here.

The edge of the strip 6 facing away from the joint edge 3 is formed with a locking element 8 extended throughout the entire strip 6. The locking element 8 has

a locking surface 10 facing the joint edge 3 and having a height of e.g. 0.5 mm. The locking element 8 is so designed that when the floor is being laid and the strip panel 2 of Fig. 1a is pressed with its joint edge 4 against the joint edge 3 of the strip panel 1 and is angled down against the subfloor 12 according to Fig. 1b, it enters a locking groove 14 formed in the underside 16 of the groove panel 2 and extending parallel to and spaced from the joint edge 4. In Fig. 1b, the locking element 8 and the locking groove 14 together form a mechanical connection locking the panels 1, 2 to each other in the direction designated D2. More specifically, the locking surface 10 of the locking element 8 serves as a stop with respect to the surface of the locking groove 14 closest to the joint edge 4.

When the panels 1 and 2 are joined together, they can however occupy such a relative position in the direction D2 that there is a small play  $\Delta$  between the locking surface 10 and the locking groove 14. This mechanical connection in the direction D2 allows mutual displacement of the panels 1, 2 in the direction of the joint, which considerably facilitates the laying and enables joining together the short sides by snap action.

As appears from Figs 4a and 4b, each panel in the system has a strip 6 at one long side 3 and a locking groove 14 at the other long side 4, as well as a strip 6' at one short side 3' and a locking groove 14' at the other short side 4'.

Furthermore, the joint edge 3 of the strip panel 1 has in its underside 18 a recess 20 extending throughout the entire joint edge 3 and forming together with the upper face 22 of the strip 6 a laterally open recess 24. The joint edge 4 of the groove panel 2 has in its top side 26 a corresponding recess 28 forming a locking tongue 30 to be accommodated in the recess 24 so as to form a mechanical connection locking the joint edges 3, 4 to each other in the direction designated D1. This con-

nection can be achieved with other designs of the joint edges 3, 4, for example by a bevel thereof such that the joint edge 4 of the groove panel 2 passes obliquely in underneath the joint edge 3 of the strip panel 1 to be  
 5 locked between that edge and the strip 6.

The panels 1, 2 can be taken up in the reverse order of laying without causing any damage to the joint, and be laid again.

The strip 6 is mounted in a tolerance-equalising  
 10 groove 40 in the underside 18 of the strip panel 1 adjacent the joint edge 3. In this embodiment, the width of the equalising groove 40 is approximately equal to half the width of the strip 6, i.e. about 15 mm. By means of the equalising groove 40, it is ensured that there will  
 15 always exist between the top side 21 of the panel 1 and the bottom of the groove 40 an exact, predetermined distance E which is slightly smaller than the minimum thickness (2.8 mm) of the floor panels 1, 2. The groove panel  
 20 2 has a corresponding tolerance-equalising surface or groove 42 in the underside 16 of the joint edge 4. The distance between the equalising surface 42 and the top side 26 of the groove panel 2 is equal to the aforementioned exact distance E. Further, the thickness of the strip 6 is so chosen that the underside 44 of the strip  
 25 is situated slightly below the undersides 18 and 16 of the floor panels 1 and 2, respectively. In this manner, the entire joint will rest on the strip 6, and all vertical downwardly-directed forces will be efficiently transmitted to the subfloor 12 without any stresses being  
 30 exerted on the joint edges 3, 4. Thanks to the provision of the equalising grooves 40, 42, an entirely even joint will be achieved on the top side, despite the thickness tolerances of the panels 1, 2, without having to perform any grinding or the like across the whole panels.  
 35 Especially, this obviates the risk of damage to the bottom layer of the compact laminate, which might give rise to bulging of the panels.

Reference is now made to the embodiment of Figs 2a-c showing in a succession substantially the same laying method as in Figs 1a and 1b. The embodiment of Figs 2a-c primarily differs from the embodiment of Figs 1a and 1b in that the strip 6 is mounted on the strip panel 1 by means of a mechanical connection instead of glue. To provide this mechanical connection, illustrated in more detail in Fig. 6, a groove 50 is provided in the underside 18 of the strip panel 1 at a distance from the recess 24.

10 The groove 50 may be formed either as a continuous groove extending throughout the entire length of the panel 1, or as a number of separate grooves. The groove 50 defines, together with the recess 24, a dovetail gripping edge 52, the underside of which exhibits an exact equalising

15 distance E to the top side 21 of the strip panel 1. The aluminium strip 6 has a number of punched and bent tongues 54, as well as one or more lips 56 which are bent round opposite sides of the gripping edge 52 in clamping engagement therewith. This connection is shown in detail

20 from below in the perspective view of Fig. 6.

Alternatively, a mechanical connection between the strip 6 and the strip panel 1 can be provided as illustrated in Fig. 7 showing in section a cut-away part of the strip panel 1 turned upside down. In Fig. 7, the mechanical connection comprises a dovetail recess 58 in the

25 underside 18 of the strip panel 1, as well as tongues/lips 60 punched and bent from the strip 6 and clamping against opposing inner sides of the recess 58.

The embodiment of Figs 2a-c is further characterised in that the locking element 8 of the strip 6 is designed as a component bent from the aluminium sheet and having an operative locking surface 10 extending at right angles up from the front side 22 of the strip 6 through a height of e.g. 0.5 mm, and a rounded guide surface 34 facilitating the insertion of the locking element 8 into the locking groove 14 when angling down the groove panel 2 towards the subfloor 12 (Fig. 2b), as well as a portion 36

30

35

which is inclined towards the subfloor 12 and which is not operative in the laying method illustrated in Figs 2a-c.

Further, it can be seen from Figs 2a-c that the joint edge 3 of the strip panel 1 has a lower bevel 70 which cooperates during laying with a corresponding upper bevel 72 of the joint edge 4 of the groove panel 2, such that the panels 1 and 2 are forced to move vertically towards each other when their joint edges 3, 4 are moved up to each other and the panels are pressed together horizontally.

Preferably, the locking surface 10 is so located relative to the joint edge 3 that when the groove panel 2, starting from the joined position in Fig. 2c, is pressed horizontally in the direction D2 against the strip panel 1 and is turned angularly up from the strip 6, the maximum distance between the axis of rotation A of the groove panel 2 and the locking surface 10 of the locking groove is such that the locking element 8 can leave the locking groove 14 without coming into contact with it.

Figs 3a-3b show another joining method for mechanically joining together the floor panels of Figs 2a-c. The method illustrated in Figs 3a-c relies on the fact that the strip 6 is resilient and is especially useful for joining together the short sides of floor panels which have already been joined along one long side as illustrated in Figs 2a-c. The method of Figs 3a-c is performed by first placing the two panels 1 and 2 flat on the subfloor 12 and then moving them horizontally towards each other according to Fig. 3b. The inclined portion 36 of the locking element 8 then serves as a guide surface which guides the joint edge 4 of the groove panel 2 up on to the upper side 22 of the strip 6. The strip 6 will then be urged downwards while the locking element 8 is sliding on the equalising surface 42. When the joint edges 3, 4 have been brought into complete engagement

with each other horizontally, the locking element 8 will snap into the locking groove 14 (Fig. 3c), thereby providing the same locking as in Fig. 2c. The same locking method can also be used by placing, in the initial position, the joint edge 4 of the groove panel with the equalising groove 42 on the locking element 10 (Fig. 3a). The inclined portion 36 of the locking element 10 then is not operative. This technique thus makes it possible to lock the floor panels mechanically in all directions, and by repeating the laying operations the whole floor can be laid without using any glue.

The invention is not restricted to the preferred embodiments described above and illustrated in the drawings, but several variants and modifications thereof are conceivable within the scope of the appended claims. The strip 6 can be divided into small sections covering the major part of the joint length. Further, the thickness of the strip 6 may vary throughout its width. All strips, locking grooves, locking elements and recesses are so dimensioned as to enable laying the floor panels with flat top sides in a manner to rest on the strip 6 in the joint. If the floor panels consist of compact laminate and if silicone or any other sealing compound, a rubber strip or any other sealing device is applied prior to laying between the flat projecting part of the strip 6 and the groove panel 2 and/or in the recess 26, a moisture-proof floor is obtained.

As appears from Fig. 6, an underlay 46, e.g. of floor board, foam or felt, can be mounted on the underside of the panels during the manufacture thereof. In one embodiment, the underlay 46 covers the strip 6 up to the locking element 8, such that the joint between the underlays 46 becomes offset in relation to the joint between the joint edges 3 and 4.

In the embodiment of Fig. 5, the strip 6 and its locking element 8 are integrally formed with the strip panel 1, the projecting part of the strip 6 thus forming



an extension of the lower part of the joint edge 3. The locking function is the same as in the embodiments described above. On the underside 18 of the strip panel 1, there is provided a separate strip, band or the like 74 extending throughout the entire length of the joint and having, in this embodiment, a width covering approximately the same surface as the separate strip 6 of the previous embodiments. The strip 74 can be provided directly on the rear side 18 or in a recess formed therein (not shown), so that the distance from the front side 21, 26 of the floor to the rear side 76, including the thickness of the strip 74, always is at least equal to the corresponding distance in the panel having the greatest thickness tolerance. The panels 1, 2 will then rest, in the joint, on the strip 74 or only on the undersides 18, 16 of the panels, if these sides are made plane.

When using a material which does not permit downward bending of the strip 6 or the locking element 8, laying can be performed in the way shown in Fig. 5. A floor panel 2a is moved angled upwardly with its long side 4a into engagement with the long side 3 of a previously laid floor panel 1 while at the same time a third floor panel 2b is moved with its short side 4b' into engagement with the short side 3a' of the upwardly-angled floor panel 2a and is fastened by angling the panel 2b downwards. The panel 2b is then pushed along the short side 3a' of the upwardly-angled floor panel 2a until its long side 4b encounters the long side 3 of the initially-laid panel 1. The two upwardly-angled panels 2a and 2b are therefore angled down on to the subfloor 12 so as to bring about locking.

By a reverse procedure the panels can be taken up in the reverse order of laying without causing any damage to the joint, and be laid again.

Several variants of preferred laying methods are conceivable. For example, the strip panel can be inserted under the groove panel, thus enabling the laying of pan-

els in all four directions with respect to the initial position.

## CLAIMS

1. A flooring system, comprising a plurality of rectangular floor panels (1, 2), which are mechanically connectable to each other in parallel rows along adjacent long edges (3, 4) and short edges (3', 4'), respectively, of the panels, said floor panels being provided with means for mechanically locking together their long edges (3, 4) as well as their short edges (3', 4') in a first direction (D1) at right angles to the principal plane of the panels, thereby forming first mechanical connections between the panels (1, 2),

characterised in

that each panel, at a rear side thereof, being provided:

(i) with a locking strip (6, 6') at one long edge (3) and at one short edge (3'), each locking strip (6, 6') being integrally formed in one piece with the panel (1, 2) and forming an extension of a lower part of the corresponding edge of the panel (1, 2) and extending throughout substantially the entire length of the corresponding edge of the panel and being provided with a projecting locking element (8), and

(ii) with a locking groove (14, 14') at an opposite long edge (4) and at an opposite short edge (4'), each locking groove (14, 14') extending parallel to and spaced from the corresponding edge (4, 4') and being open at a rear side of the panel (1, 2), said locking strips (6, 6') and locking grooves (14, 14') forming second mechanical connections locking the panels to each other in a second direction (D2) parallel to the principal plane and at right angles to the joint edges (3, 4; 3', 4'), such that a strip (6, 6') of a first one (1) of two joined panels projects on the rear side of the second

panel with its locking element (8) received in the locking groove (14, 14') of the second panel (2),

that the first mechanical connection allows mutual displacement of the panels (1, 2) in the direction of the long edges (3, 4),

that the panels, when joined together along their long edges (3, 4), can occupy a relative position in said second direction (D2) where a play ( $\Delta$ ) exists between the locking groove (14) and a locking surface (10) on the locking element (8) that is facing the long edges (3, 4), such that also the second mechanical connection allow mutual displacement of the panels (1, 2) in the direction of the long edges (3, 4),

that the second mechanical connection along the long edges (3, 4) is so conceived as to allow the locking element (8) to leave the locking groove (14) if the panel (2) associated with the locking groove (14) is turned about its long edge (4) angularly away from the strip (6), and

that each locking strip (6') at the short edges (3', 4') is flexible and resilient such that two panels (1, 2), having already been mechanically joined to a common long edge of a third panel, can be mechanically joined together at their adjacent short edges (3', 4') by displacing said two panels horizontally towards each other, while resiliently urging the flexible strip (6') at one (3') of said short edges downwards, until said adjacent short edges (3', 4') of the two panels (1, 2) have been brought into complete engagement with each other horizontally and the locking element (8) at said one short edge (3') thereby snaps into the locking groove (14') at the second short edge (4').

2. A flooring system as claimed in claim 1, characterised in that the first mechanical connection as well as the second mechanical connection along the long edges (3, 4) are such that they allow the

locking element (8) to enter the locking groove (14) if the panel (2) associated with the groove (14) is turned about its joint edge (4) angularly towards the strip (6) while holding the upper part of the joint edge (4) of the panel (2) associated with the groove in contact with the upper part of the joint edge (3) of the adjacent panel (1) associated with the strip.

3. A flooring system as claimed in claim 1 or 2, characterised in that the first mechanical connection as well as the second mechanical connection along the long edges (3, 4) are such that they allow the locking element (8) to leave the locking groove (14) if the panel (2) associated with the groove is turned about its joint edge (4) angularly away from the strip (6) while holding the upper part of the joint edge (4) of the panel (2) associated with the groove in contact with the upper part of the joint edge (3) of the adjacent panel (1) associated with the strip.

20

4. A flooring system as claimed in any one of the preceding claims, characterised in that, in order to resiliently urging the flexible strip (6') downwards while displacing said adjacent short edges (3', 4') horizontally towards each other, said adjacent short edges (3', 4') being provided with cooperating lower and upper bevels (70, 72), such that the panels (1, 2) are forced to move vertically towards each other when their adjacent short edges (3', 4') are moved up to each other and the panels (1, 2) are pressed together horizontally.

5. A flooring system as claimed in any one of the preceding claims, characterised in that the locking surface (10) of the locking element (8) is extended from the front side (22) of the strip (6, 6') through a height in said first direction that is less than or equal to 2 mm.

6. A flooring system as claimed in any one of the preceding claims, characterised in that the locking element (8) consists of a locking edge extended  
5 continuously along the strip (6, 6').

7. A flooring system as claimed in any one of the preceding claims, characterised in that an underlay (46) of floor boards, foam, felt or the like is  
10 fixed to the rear sides (18, 16) of the panels (1, 2).

8. A flooring system as claimed in claim 7, characterised in that the underlay (46) is fixed so as to cover the strip (6, 6') in said second  
15 direction at least up to the locking element (8), such that a joint between the underlays (46) of the two adjacent panels (1, 2) is offset in said second direction relative to the joint edges (3, 4; 3', 4').

20 9. A system as claimed in any one of the preceding claims, characterised in that a sealing means, such as a sealing compound, a rubber strip or the like, is provided on the front side (22) of the strip (6, 6') between the locking element (8) and the joint edge  
25 (3, 3') of the panel (1) associated with the strip to seal against the other panel (2).

## ABSTRACT

The invention relates to a system for laying and mechanically joining building panels, especially thin, hard, floating floors. Adjacent joint edges (3, 4) of two panels (1, 2) engage each other to provide a first mechanical connection locking the joint edges (3, 4) in a first direction (D1) perpendicular to the principal plane of the panels. In each joint, there is further provided a strip (6) which is integrated with one joint edge (3) and which projects behind the other joint edge (4). The strip (6) has an upwardly protruding locking element (8) engaging in a locking groove (14) in the rear side (16) of the other joint edge (4) to form a second mechanical connection locking the panels (1, 2) in a second direction (D2) parallel to the principal plane of the panels and at right angles to the joint. Both the first and the second mechanical connection allow mutual displacement of joined panels (1, 2) in the direction of the joint.

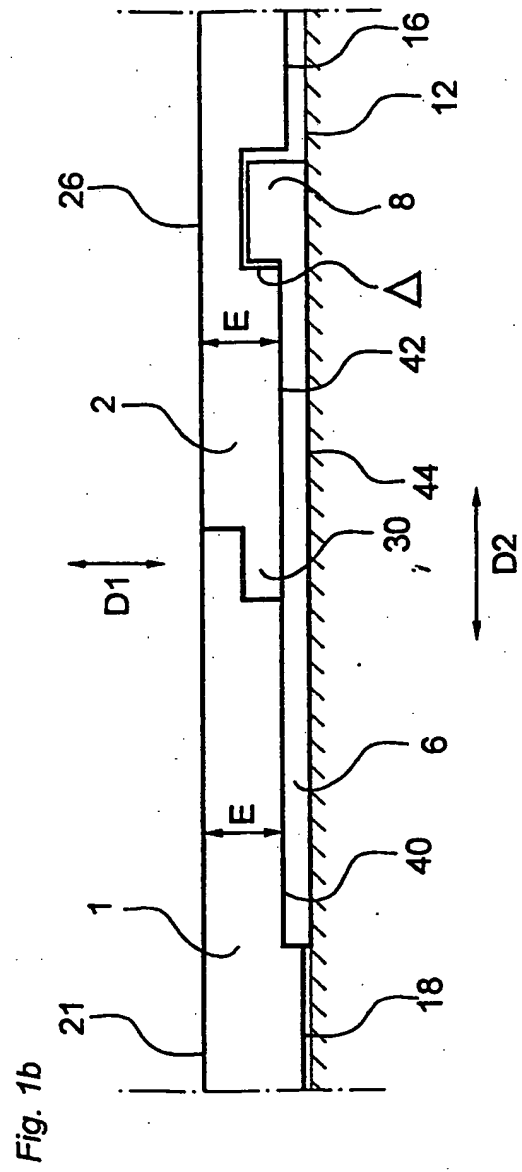
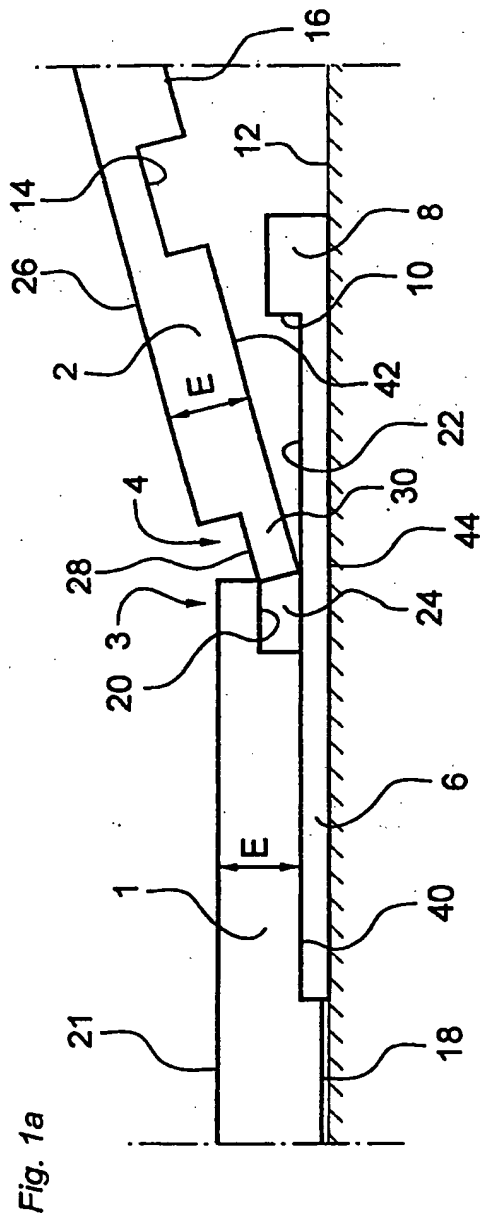




Fig. 2a

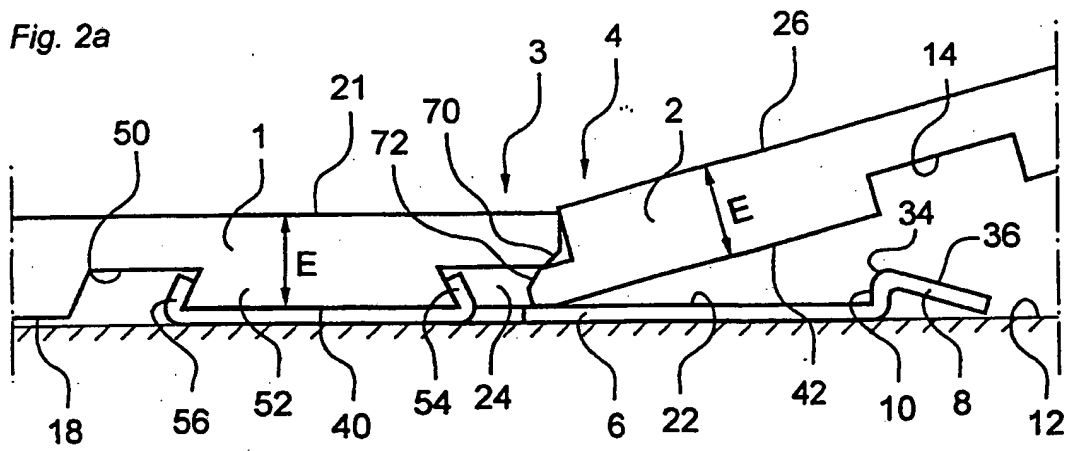


Fig. 2b

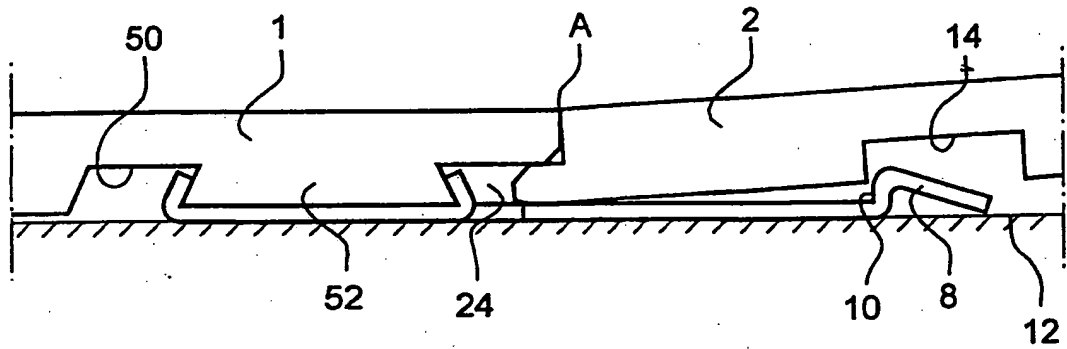


Fig. 2c

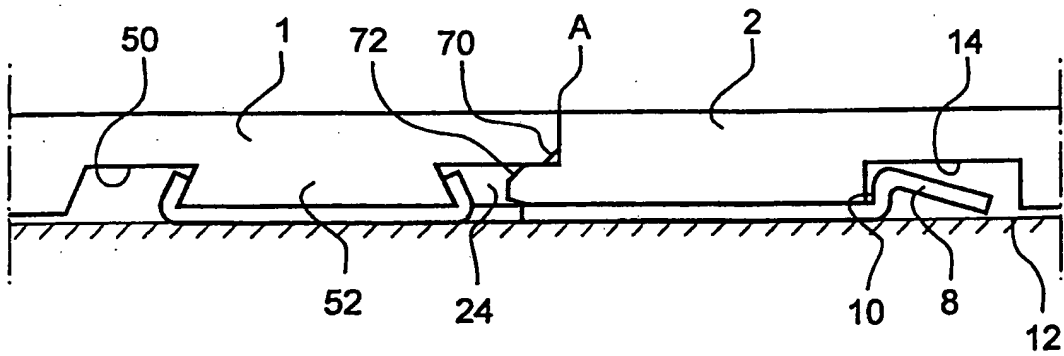


Fig. 3a

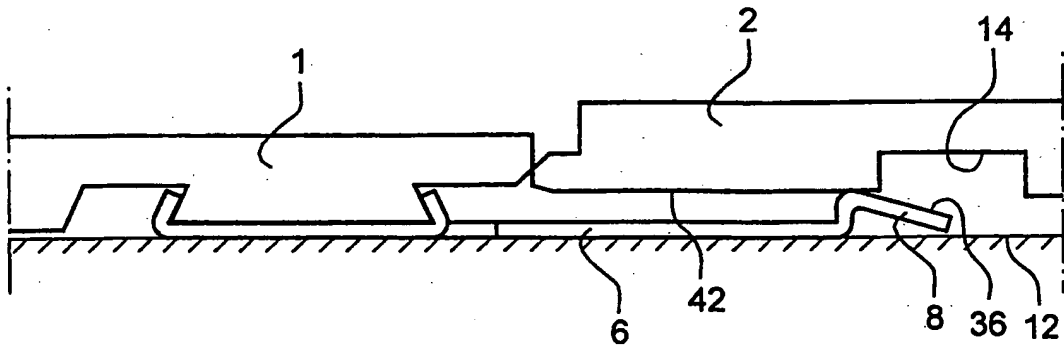


Fig. 3b

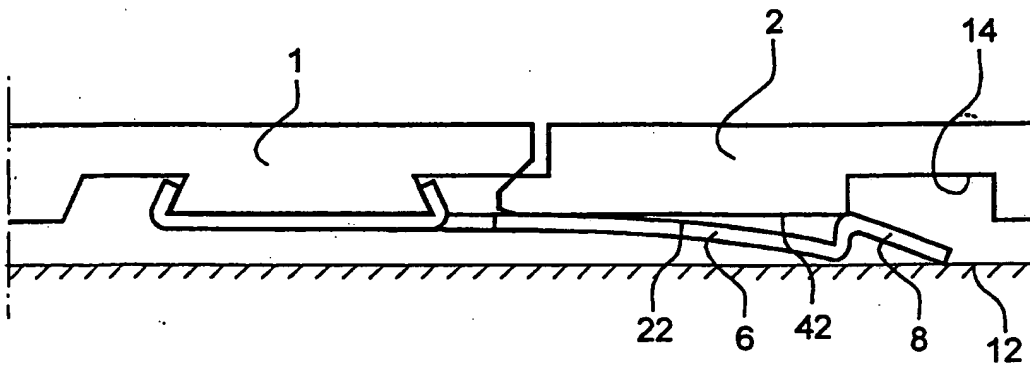


Fig. 3c

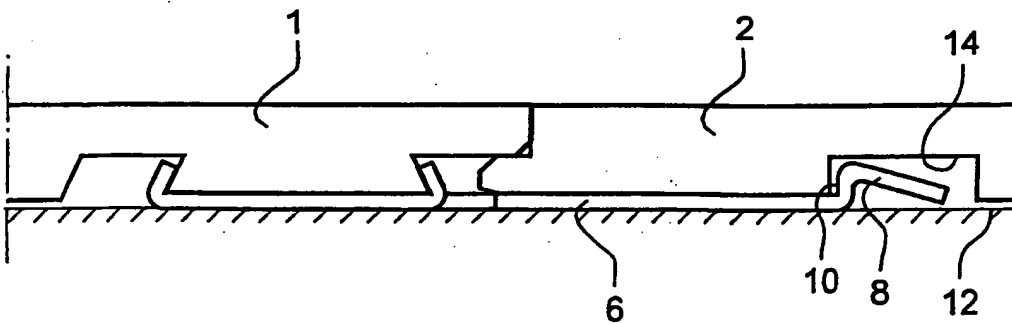


Fig. 4a

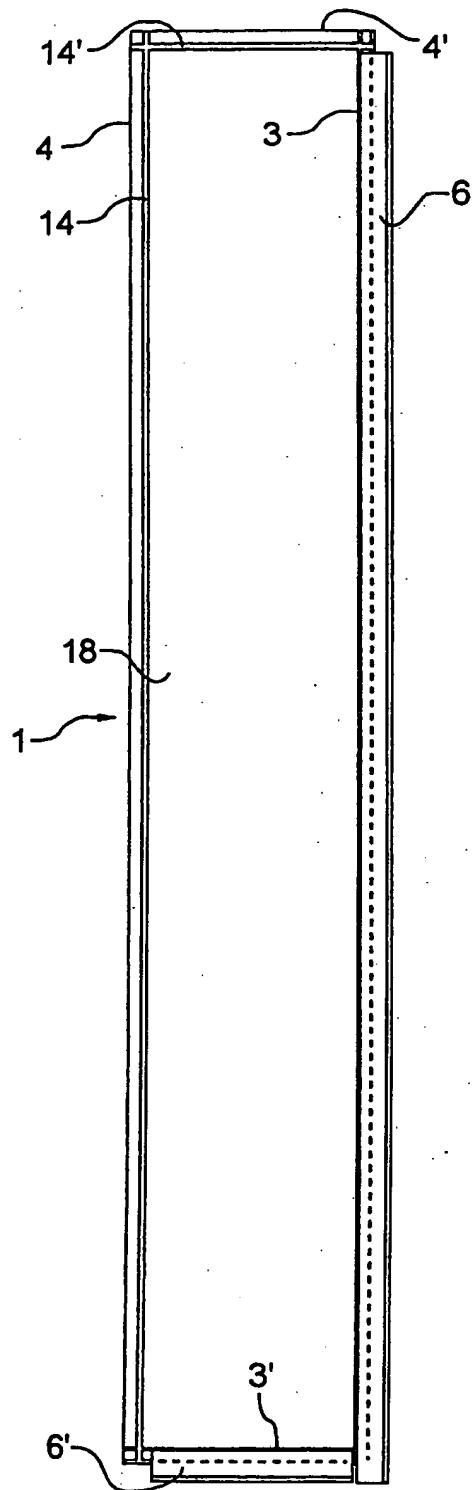


Fig. 4b

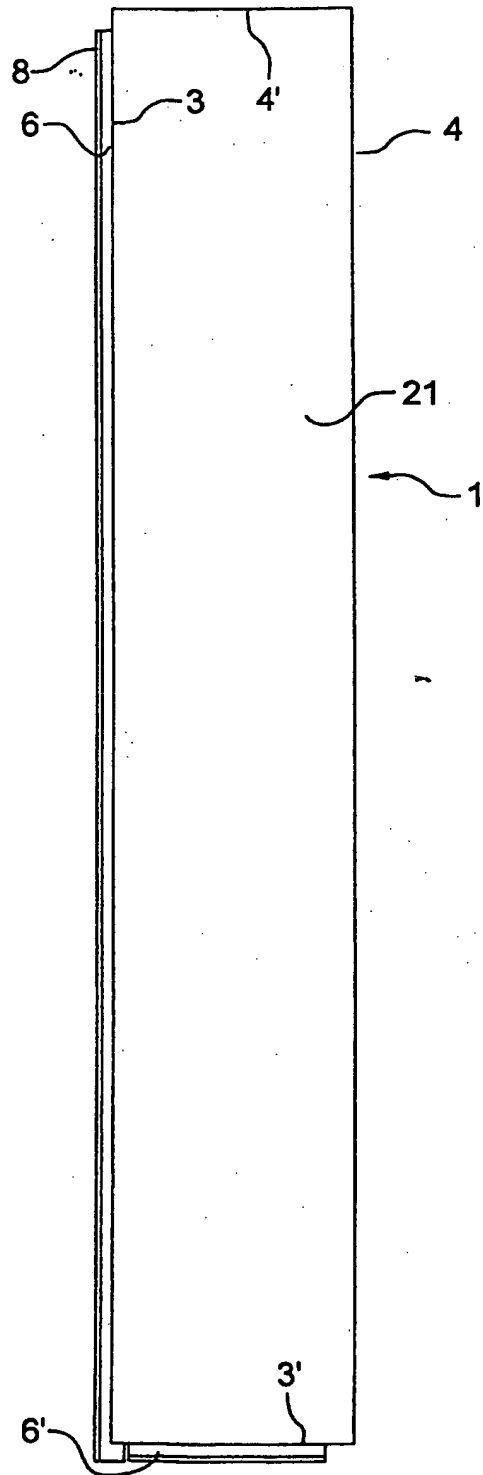
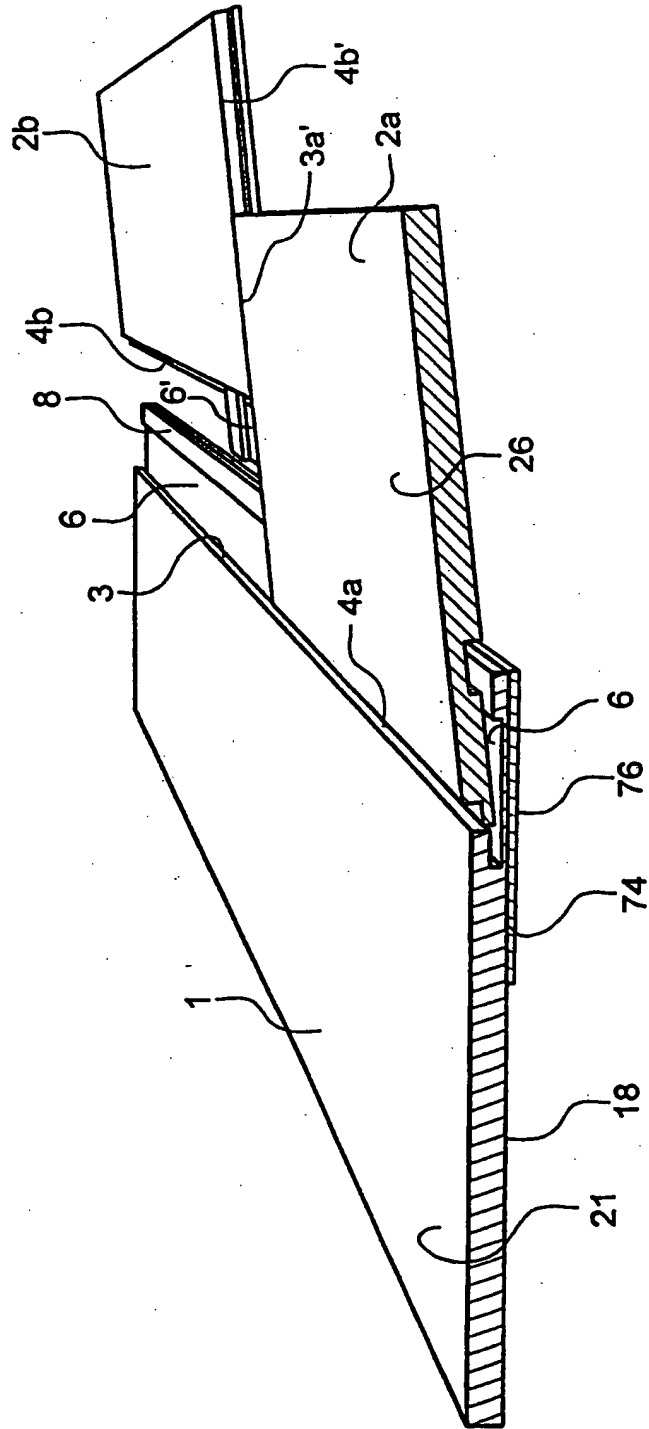
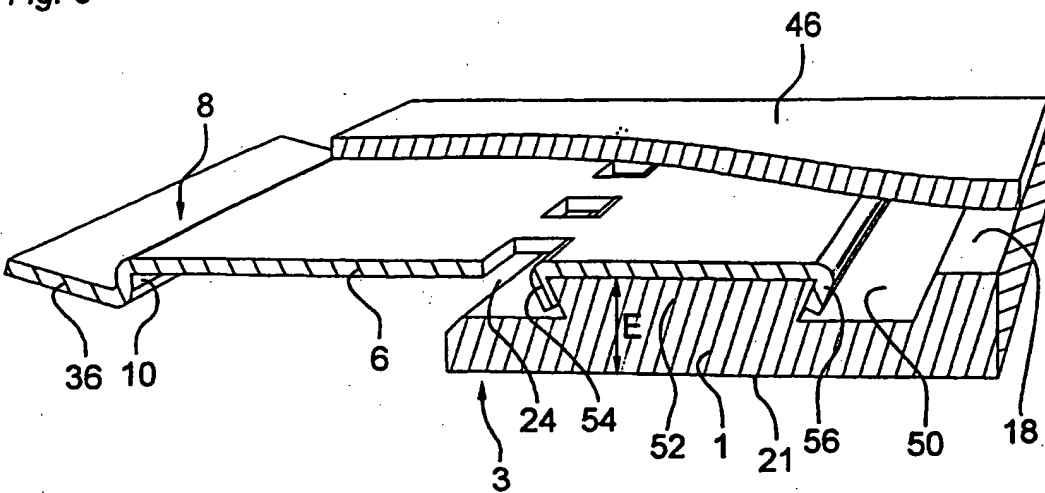


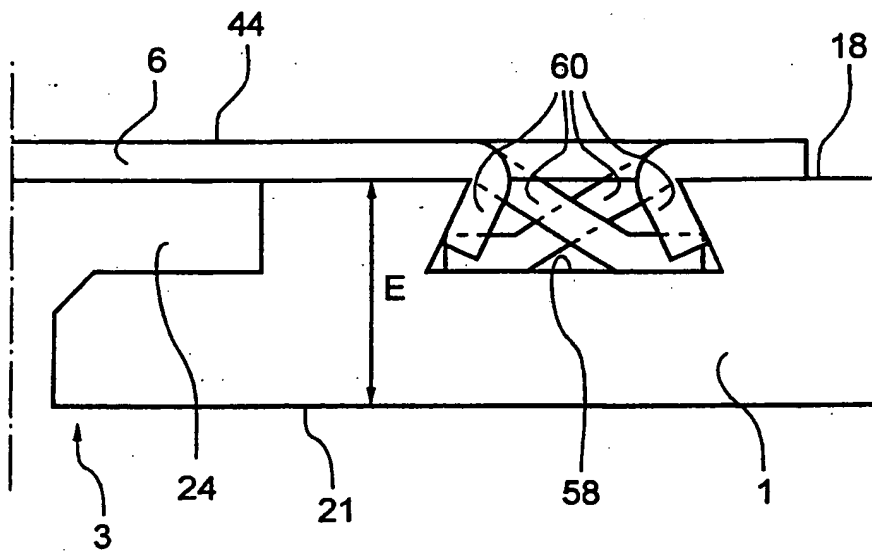
Fig. 5



**Fig. 6**



**Fig. 7**



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Application No.

Applicant's or Representative's Reference:

2981378

In respect of the European patent application (title of the invention)

FLOORING SYSTEM

I(we), the undersigned \*)

Sören Giver

do hereby designate as inventor(s):

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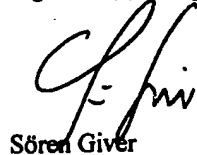
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